OMRON

V680-series ID Flag Sensors

User's Manual

ID Flag Sensors

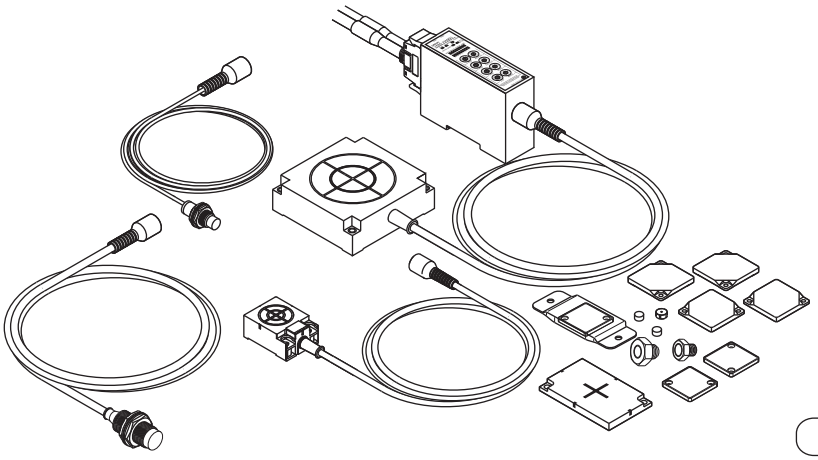
V680-HAM91
V680-HAM81

Antennas

V680-HS51
V680-HS52
V680-HS63
V680-HS65

RF Tags

V680-D1KP52MT
V680-D1KP53M
V680-D1KP52M-BT01/D1KP52M-BT11
V680-D1KP66T/-D1KP66MT
V680-D1KP66T-SP
V680-D2KF52M
V680-D2KF52M-BT01/D2KF52M-BT11
V680-D2KF67/-D2KF67M
V680-D8KF67/-D8KF67M
V680-D8KF68/-D32KF68



Man. No.: Z279-E1-03

Introduction

Thank you for purchasing a V680-series ID System. This manual describes the functions, performance, and application methods needed for optimum use of the V680-series RFID System.

Please observe the following items when using the ID System.

- Allow the ID System to be installed and operated only by qualified specialist with a sufficient knowledge of electrical systems.
- Read and understand this manual before attempting to use the ID System and use the ID System correctly.
- Keep this manual in a safe and accessible location so that it is available for reference when required.

Introduc-tion	READ AND UNDERSTAND THIS DOCUMENT
Section 1	Product Overview
Section 2	Names and Functions of Components
Section 3	Functions
Section 4	Installation, Connections, and Wiring
Section 5	Control I/O Interface
Section 6	Troubleshooting
Section 7	Appendices

RFID System

V680-HAM91	ID Flag Sensor
V680-HAM81	ID Flag Sensor
V680-HS51	Antenna
V680-HS52	Antenna
V680-HS63	Antenna
V680-HS65	Antenna
V680-1KP52MT	RF Tag
V680-1KP52MT-BT01/-D1KP52M-BT11	RF Tag
V680-1KP53M	RF Tag
V680-1KP66T/-D1KP66MT	RF Tag
V680-1KP66T-SP	RF Tag
V680-2KF52M	RF Tag
V680-2KF52MT-BT01/-D2KF52M-BT11	RF Tag
V680-2KF67/-D2KF67M	RF Tag
V680-8KF67/-D8KF67M	RF Tag
V680-D8KF68/-D32KF68	RF Tag

User's Manual

READ AND UNDERSTAND THIS DOCUMENT

Please read and understand this document before using the products. Please consult your OMRON representative if you have any questions or comments.

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- Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this document.
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Safety Precautions

●Alert Symbols for Safe Use

The following symbols are used in this manual to indicate precautions that must be observed to ensure safe use of V680-HAM91, V680-HAM81, V680-series Antennas, and V680-series RF Tags.

The precautions provided here contain important safety information. Be sure to observe these precautions.

The following signal words are used in this manual.

⚠ WARNING	Indicates a potentially hazardous situation which, if not avoided, will result in minor or moderate injury, or may result in serious injury or death. Additionally, there may be significant property damage.

●Meanings of Alert Symbols

	Indicates general prohibitions for which there is no specific symbol.

●Warning

⚠ WARNING

These Products are not designed to be used either directly or indirectly in applications that detect human presence for the purpose of maintaining safety. Do not use these Products as a sensing means for protecting human lives.

Precautions for Safe Use

Be sure to observe the following precautions to ensure safe use of the Products.

1. Do not use the Products in environments with flammable, explosive, or corrosive gasses.
2. Do not attempt to disassemble, repair, or modify any Product.
3. Because a cable has a locking mechanism, make sure that it has been locked before using the cable.
4. Make sure the power supplied by the DC power supply unit is within the rated power supply voltage (24 VDC +10%/−15%) before using the Product.
5. Do not connect the power supply in reverse.
6. Do not allow water or pieces of wire to enter from openings in the case. Doing so may cause fire or electric shock.
7. Provide sufficient ventilation space.
8. Do not install the Products near any equipment that generates a large amount of heat (such as heaters, transformers, and large-capacity resistors).
9. Turn OFF the Controller power supply before mounting or removing an Antenna.
10. If an error is detected in any Product, immediately stop operation and turn OFF the power supply. Consult with an OMRON representative.
11. Dispose of the Products as industrial waste.
12. Do not clean the Products with paint thinner, benzene, acetone, or kerosene.
13. If multiple Antennas are mounted near each other, communications performance may decrease due to mutual interference. Refer to *Mutual Interference between Antennas (Reference)* on page 149 and check to make sure there is no mutual interference between the Antennas.
14. To remove the Unit, catch a tool on the hook and gently remove the Unit.
15. Do not perform wiring incorrectly or short-circuit the load. Doing so may result in rupture or damage from burning.
16. Do not use the product in environments subject to oil.
17. Do not never use the AC power supply.

Precautions for Correct Use

Always observe the following precautions to prevent operation failures, malfunctions, and adverse effects on performance and equipment.

1. Installation and Storage Environment

Do not use or store the Product in the following locations.

- Locations subject to corrosive gases, dust, dirt, metal powder, or salt.
- Locations where the specified ambient temperature and ambient humidity range is exceeded.
- Locations subject to extreme temperature changes that may result in condensation.
- Locations where the product would be directly subjected to vibration or shock exceeding specifications.
- Locations subject to contact with water, oil, or chemicals

2. Installation

- The Products communicate with RF Tags using the 13.56-MHz frequency band. Some motors, inverters, and switching power supplies generate noise that can affect communications with the RF Tags and cause errors. If such devices are located near the RF Tags, always test operation in advance to confirm whether the system will be affected.
- Observe the following precautions to minimize the effects of normal noise.
  (1) Ground all metal objects in the vicinity of the Products to 100 Ω or less.
  (2) Do not use the Products near high-voltage or high-current lines.
- Do not pull on the cables with excessive strength.
- The Product is not waterproof. Do not use it in an environment where mist is present.
- Do not expose the Products to chemicals that adversely affect the Product materials.
- The dust cover is attached at the CN2 connector. When neither writing in the RF Tags nor address shift function/noise check function is used, the connection to this connector is unnecessary. In this case, please keep the duct cover attached.

3. About control at the initial state

There is a possibility that the state of Input/Output becomes unstable while starting this product. Please control Input/Output after one second or more passes after turning on the power supply to this product.

Meanings of Symbols

Indicates particularly important points related to a function, including precautions and application advice.

Indicates page numbers containing relevant information.

Indicates reference to helpful information and explanations for difficult terminology.

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Section 1
Product Overview

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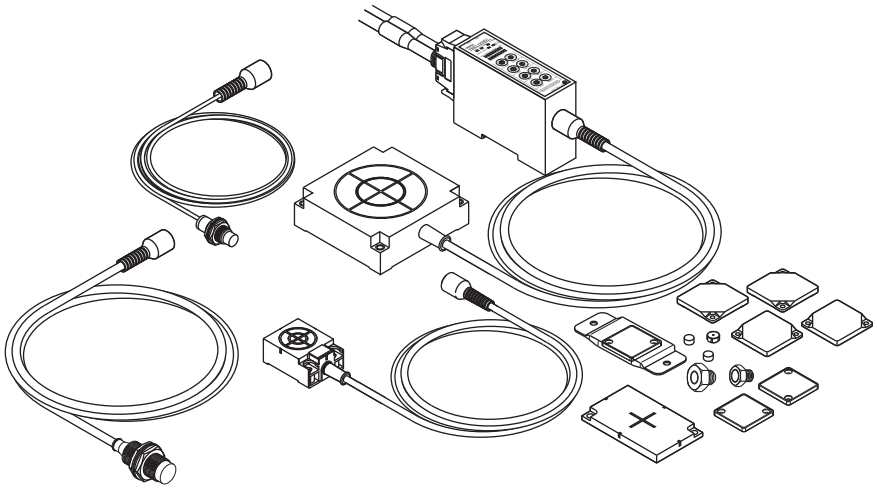
Features

The V680-series ID System uses electromagnetic induction in the 13.56-MHz bandwidth, which conforms to the international standards in ISO/IEC 18000-3 (ISO/IEC 15693). A V680-series ID System enables reading and writing RF Tag data without contact by connecting a V680-HAM91/V680-HAM81 ID Flag Sensor to a V680-series Antenna. With control performed in connection with the Basic I/O Units of a Programmable Controller, ID Flag Sensors provide data management for applications such as quality and process control at production sites.



■ Simple Operation with I/O Control as Simple as Using a Regular Sensor

The V680-HAM91 and V680-HAM81 can be used right away to create an RFID System with operation as easy as with regular Sensors. Start operation simply by setting the mode switch on the ID Flag Sensor to output the read results to the I/O interface.

■ Advanced Line Management

In accessing RF Tag data, up to 64,000 IDs are possible with 16-bit data. And, using the address shift function enables accessing up to 128 bits, making it possible to build advanced lines.

■ Conforms to International Standards of ISO/IEC 18000-3 (ISO/IEC 15693)

Compliance with international standards enables the V680 to be exported to and used in the world's main countries.

■ RF Tags Available with EEPROM or FRAM

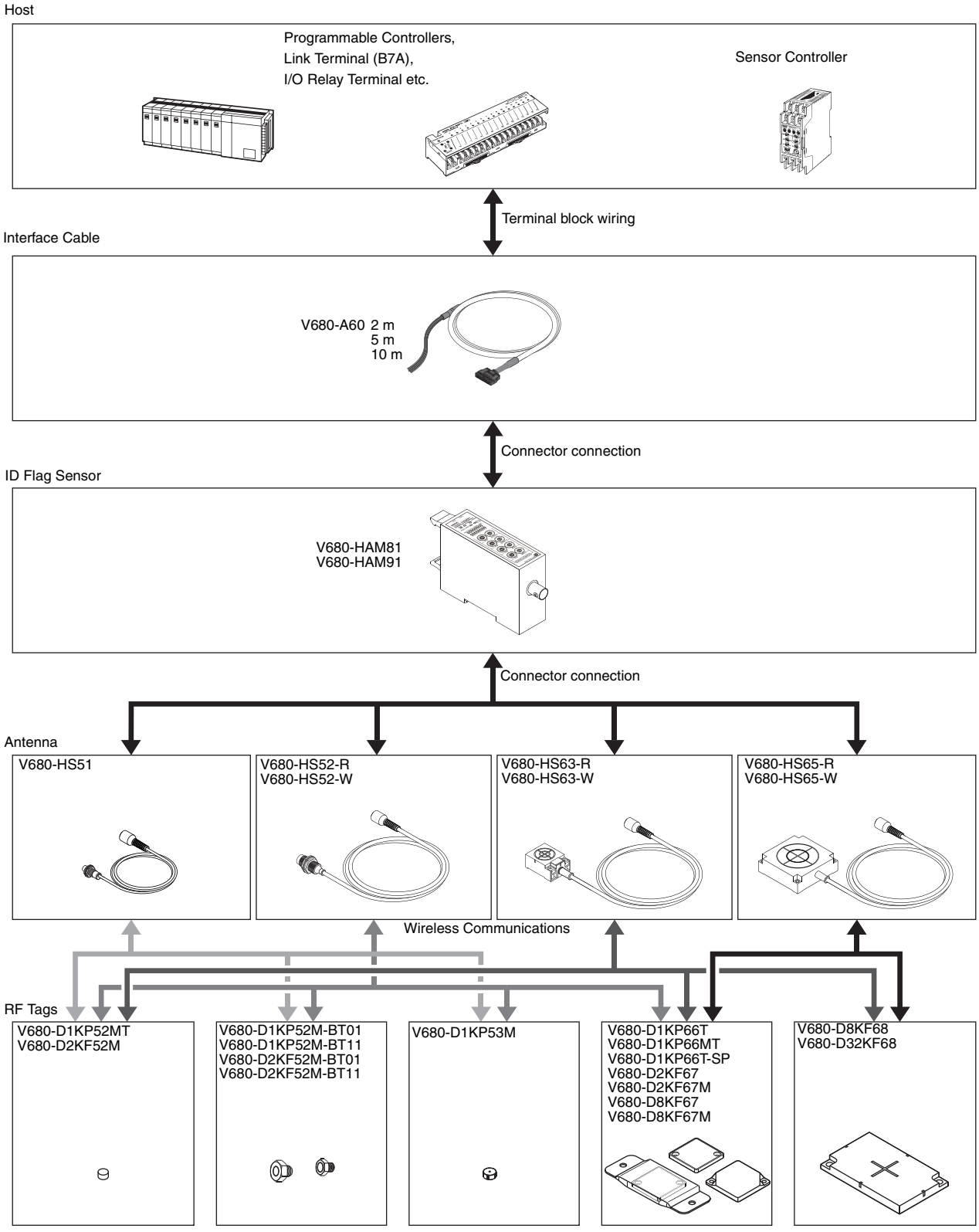
Two types of RF Tag memory are available: EEPROM, with a maximum heat resistance of 180°C (30 min./200 cycles) and a capacity of 1,000 bytes, and FRAM, with a capacity of 2, 8, or 32 kilobytes, and long memory life of 10 billion accesses. Chose the ideal type for various worksite applications.

■ Smooth Replacement of Previous RFID Systems

All functions of the previous V600 Series are supported, so assets on existing lines can still be used.

System Configuration

The ID Flag Sensor is connected to a Programmable Controller or wire-reduction device using I/O Interface. The ID Flag Sensor can be connected with a connector by using a optional interface cable. All of the various V680-series Antennas and RF Tags can be used.



CHECK!

When embedding the V680-D1KP52MT, V680-D1KP53M, and V680-D2KF52M in a metal surface, please use the V680-HS51 or -HS52 Antenna. It can not communicate with the V680-HS63 Antenna.

MEMO

Section 2
Names and Functions of Components

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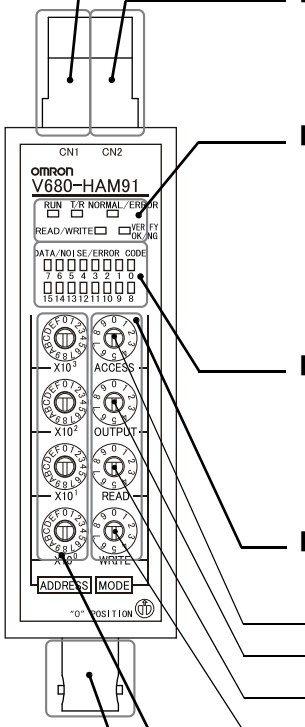
ID Flag Sensor



■ Interface Connector : CN1

Connect to 24VDC power, INHIBIT/TRIG Input and Outputs.

Recommended Power Supply : S8VS-03024(OMRON)

Note. Please use the Interface Cable(Optional).

■ Interface Connector : CN2

Connect to Inputs.

Note. Please use the optional Interface Cable(Optional).

■ State Indicator LED

RUN : ID Flag Sensor Status(Green)

T/R : RF Tag communications status(Yellow)

NORMAL/ERROR : IF Flag Sensor operation result(Green/Red)

READ/WRITE : READ or WRITE operation status(Green/Yellow)

VERIFY OK/NG : Verify Read operation result(Green/Red)

■ Data Display LED

Date Display(Green)

Error Code Display(Red)

Noise Level Display (Green)

■ Mode Switches

IF Flag Sensor Operation Mode setting switches.

- Access Mode Setting Switch : Set the access mode to the RF Tags.
- Output Mode Setting Switch : Set the output mode and output time.
- Read Mode Setting Switch : Set the read operation mode.
- Write Mode Setting Switch : Set the write operation mode.

■ Access Address Setting

Set the access address to the RF Tag in hexadecimal notation (0000 hex to FFFF hex)

■ Antenna Connector

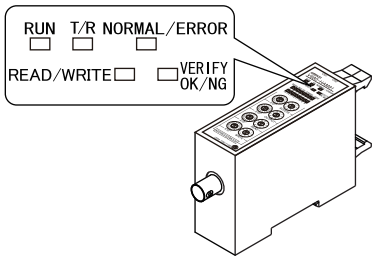
Connects to V680-series Antennas.

■ Status Indicator LED

▪ RUN

The ID Flag Sensor status is displayed.

Status	Definition
Lit green	Normal
Not lit	No power supply or Fatal error.



▪ T/R

The communication status with the RF Tags is displayed.

Status	Definition
Lit yellow	Communicating with RF Tag , Measuring Noise level.
Not lit	Standby

▪ NORMAL ERROR

The ID Flag Sensor operation result is displayed.

Status	Definition
Lit green	Normal Completion
Lit red	Error occurred
Not lit	Standby

▪ READ/WRITE

The Read or Write operation mode is displayed.

Status	Definition
Lit green	Read operation
Lit yellow	Write operation
Not lit	Standby or Noise check operation

▪ VERIFY OK/NG

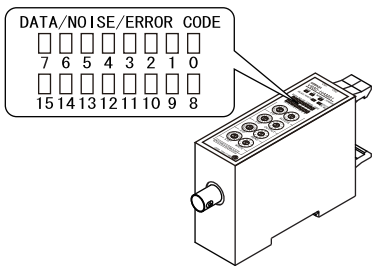
The Verify Read operation result is displayed.

Status	Definition
Lit green	Verification result is matched.
Lit red	Verification result is mismatched.
Not lit	Standby

■ Data Display LED

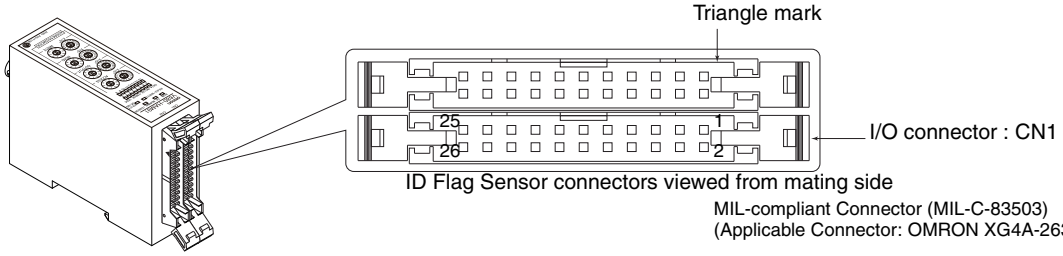
The Data Display LED show the 16 bits of data that was read or written when communication complete normally, and show the Error Code when error was occurred. It also show the Noise Level when measured the noise level.

Status	Definition
Lit green	Data (Read, Write, Noise Level)
Flashing red/Lit red	Error Code
Not lit	Standby



■ I/O Connector CN1

CN1 connects to 24 VDC, INHIBIT/TRIG input and all other Outputs.



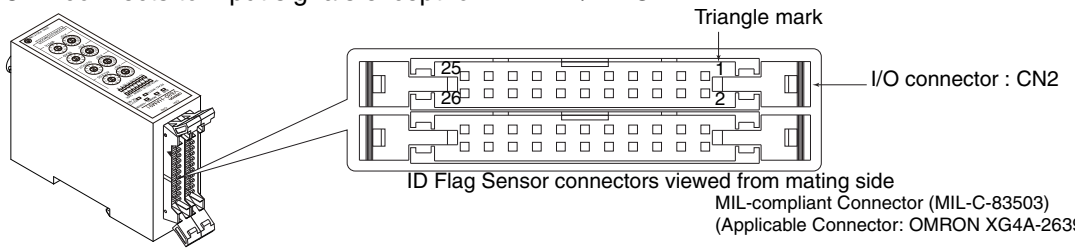
Pin	Name	Wire colors (See Note1.)	Description	I/O
1	FG	FG line	FG ground terminal	FG
2	Not used.	---	---	---
3	Not used.	---	---	---
4	NOISE_OUT	Gray/Red	ON when checking noise	Output
5	0 V	Blue	24-VDC power supply GND line	Power supply
6	24 VDC	Brown	24-VDC power supply input line	Power supply
7	PARITY	Gray/White	Parity check output (Even: OFF, Odd: ON)	Output
8	INHIBIT/TRIG	Red	Inhibit input for auto modes 1, 2, and 3 Trigger input for trigger modes 1, 2, and 3	Input
9	NORMAL/STRB	Light green	Normal read completion output in Read Mode Output for verification results in Verify Mode Normal write completion output for Write Mode Strobe output when Read Mode is set to Wire-saving Mode	Output
10	$\overline{\text{ERR}}$	Purple	Error output (OFF: active) (See Note2.)	Output
11	OD9	White/Red	Read data output bit 10	Output
12	OD8	White/Black	Read data output bit 9	Output
13	OD11	White/Yellow	Read data output bit 12	Outpu
14	OD10	White/Green	Read data output bit 11	Output
15	OD13	White/Blue	Read data output bit 14	Output
16	OD12	White/Brown	Read data output bit 13	Output
17	OD15	Gray/Black	Read data output bit 16	Output
18	OD14	White/Orange	Read data output bit 15	Output
19	OD1	Yellow	Read data output bit 2	Output
20	OD0	Green	Read data output bit 1 Match output in Verify Mode	Output
21	OD3	Black	Read data output bit 4	Output
22	OD2	White	Read data output bit 3	Output
23	OD5	Orange	Read data output bit 6	Output
24	OD4	Gray	Read data output bit 5	Output
25	OD7	Pink	Read data output bit 8 Mismatch output in Verify Mode	Output
26	OD6	Light blue	Read data output bit 7	Output

Note1: Wire colors are for the V680-A60 Interface Cable (sold separately).

2: ERR Output is OFF active. It turns ON after Powered-up correctly. It can use as checking output for powering up the product.

■ I/O Connector CN2

CN2 connects to Input signals except for INHIBIT/TRIG.



Pin No..	Name	Wire colors (See Note.)	Description	I/O
1	FG	FG line	FG ground terminal	FG
2	Not used.	---	---	---
3	Not used	---	---	---
4	Not used	Gray/Red	---	---
5	$\overline{R}$/W	Blue	Read/write mode switching input (Read: OFF, Write: ON)	Input
6	NOISE_IN/WRITE PROTECT	Brown	Noise check mode setting input (Noise check : ON in Read mode) Write protect enable/disable input (Enabled : OFF, Disabled : ON in Write mode)	Input
7	ADR2	Gray/White	Address shift input bit 2	Input
8	Not used	Red	---	Input
9	ADR0	Light green	Address shift input bit 0	Input
10	ADR1	Purple	Address shift input bit 1	Input
11	ID9	White/Red	Write data input bit 10 in Write Mode. Verify data input bit 10 in Verify Mode	Input
12	ID8	White/Black	Write data input bit 9 in Write Mode Verify data input bit 9 in Verify Mode	Input
13	ID11	White/Yellow	Write data input bit 12 in Write Mode Verify data input bit 12 in Verify Mode	Input
14	ID10	White/Green	Write data input bit 11 in Write Mode Verify data input bit 11 in Verify Mode	Input
15	ID13	White/Blue	Write data input bit 14 in Write Mode Verify data input bit 14 in Verify Mode	Input
16	ID12	White/Brown	Write data input bit 13 in Write Mode Verify data input bit 13 in Verify Mode	Input
17	ID15	Gray/Black	Write data input bit 16 in Write Mode Verify data input bit 16 in Verify Mode	Input
18	ID14	White/Orange	Write data input bit 15 in Write Mode Verify data input bit 15 in Verify Mode	Input
19	ID1	Yellow	Write data input bit 2 in Write Mode Verify data input bit 2 in Verify Mode	Input
20	ID0	Green	Write data input bit 1 in Write Mode Verify data input bit 1 in Verify Mode	Input
21	ID3	Black	Write data input bit 4 in Write Mode Verify data input bit 4 in Verify Mode	Input
22	ID2	White	Write data input bit 3 in Write Mode Verify data input bit 3 in Verify Mode	Input
23	ID5	Orange	Write data input bit 6 in Write Mode Verify data input bit 6 in Verify Mode	Input
24	ID4	Gray	Write data input bit 5 in Write Mode Verify data input bit 5 in Verify Mode	Input
25	ID7	Pink	Write data input bit 8 in Write Mode Verify data input bit 8 in Verify Mode	Input
26	ID6	Light blue	Write data input bit 7 in Write Mode Verify data input bit 7 in Verify Mode	Input

Note: Wire colors are for the V680-A60 Interface Cable (sold separately).

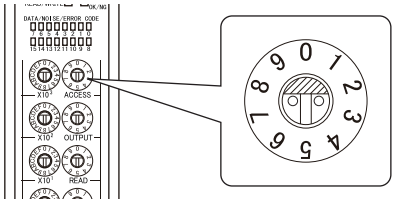
CHECK!

This connector is not required if data will not be written to RF Tags or the address shift function and noise check function will not be used.

■ Mode Setting Switches

▪ Access Mode Setting Switch

Use this switch to set the communications mode for communications with RF Tags.



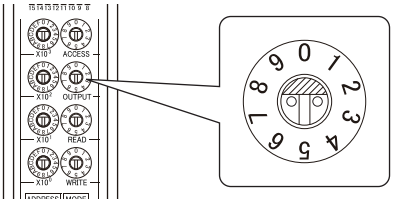
Refer to the following figure for a set position of the Setting Switch.

Example) When it sets "1".

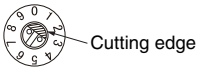
No.	Name	Remarks	
0	SYNC1	TRIGGER MODE 1 : The ID Flag Sensor starts to communicate with RF Tags when the trigger signal inputs.	p.54
1	AUTO1	AUTO MODE 1 : The ID Flag Sensor starts to communicate with RF Tags automatically when the RF Tag comes in the communication area.	p.58
2	SYNC2	TRIGGER MODE 2 : Functional compatible mode with V600 series (V600-HAM91/-HAM81/-HAR91/-HAR81)	p.166
3	AUTO2	AUTO MODE 2 : Functional compatible mode with V600 series (V600-HAM91/-HAM81/-HAR91/-HAR81)	p.169
4	SYNC3	TRIGGER MODE 3 : Functional compatible mode of V600 series (V600-HAR92)	p.172
5	AUTO3	AUTO MODE 3 : Functional compatible mode of V600 series (V600-HAR92)	p.174
6	NOISE CHECK	NOISE MEASURING MODE : The maintenance mode to measure the environmental noise level.	p.61
7	---	Setting Prohibit (The ID Flag Sensor indicates Settings Error.)	
8			
9			

■ Output Mode Setting Switch

Use this switch to set the output mode and output time width.



Refer to the following figure for a set position of the Setting Switch.



Example) When it sets "1".

No.	Setting	Setting	Combination with the access mode
0	10 ms OFF DELAY	10 ms OFF delay	Auto Mode 1, Auto Mode 3, or Trigger Mode 3 **Note:** A mode setting error will occur if one of the above access modes is not set.
1	50 ms OFF DELAY	50 ms OFF delay	
2	500 ms OFF DELAY	500 ms OFF delay	
3	10 ms	10 ms output	Auto Mode 2 or Trigger Mode 3 **Note:** A mode setting error will occur if one of the above access modes is not set.
4	50 ms	50 ms output	
5	CONTINUOUS	Continuous output	
6	---	Setting prohibited : except for Trigger Mode1(See Note.) (The ID Flag Sensor indicates Settings Error.)	
7			
8			
9			

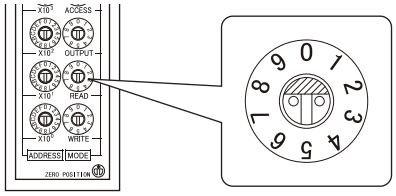
Note. TRIGGER MODE 1 is not influenced the OUTPUT MODE settings. Set the OUTPUT mode switch either from "0" to "9".

CHECK!

The setting of the mode setting switch is read only when the power supply is turned ON. Therefore, settings cannot be changed while the power is being supplied. Turn OFF the power supply before changing the settings.

■ Read Mode Setting Switch

Use this switch to set the mode for reading data.



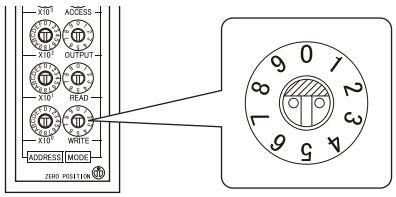
Refer to the following figure for a set position of the Setting Switch.

Example) When it sets "1".

No.	Name	Description	
0	DATA READ1	Outputs read data.	
1	DATA READ2	Outputs read data in Wire-saving Mode.	p.28
2	VERIFY	Compares external input data with read data and outputs the verification result.	p.27
3	---	Setting prohibited. (The ID Flag Sensor indicates Settings Error.)	---
4			
5			
6			
7			
8			
9			

■ Write Mode Setting Switch

Use this switch to set the mode for writing data.



Refer to the following figure for a set position of the Setting Switch.

Example) When it sets "1".

No.	Name	Description
0	2-BYTE WRITE	Write the 2 bytes (16 bits) of data that is input to the external data inputs (ID 0 to ID15) to the RF Tag.
1	BIT SET	When external data (ID0 to ID15) is input, only the ON bits will be turned ON. The other bits will not be changed.
2	BIT CLEAR	When external data (ID0 to ID15) is input, only the ON bits will be turned OFF. The other bits will not be changed.
3	1-BYTE WRITE	Write the 1 byte (8 bits) of data that is input to external data input bits ID0 to ID7 to the RF Tag. Inputs for external data input bits ID8 to ID15 will be ignored. (See Note.)
4	---	Setting prohibited. (The ID Flag Sensor indicates Settings Error.)
5		
6		
7		
8		
9		

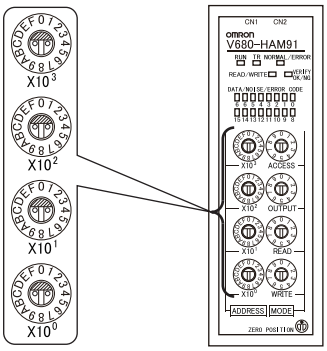
Note : This is for supporting V600-series (V600-HAM91/-HAM81) 1byte(8bits) write operation.

CHECK!

The setting of the mode setting switch is read only when the power supply is turned ON. Therefore, settings cannot be changed while the power is being supplied. Turn OFF the power supply before changing the settings.

■Access Address Setting Switches

Use these switches to set the memory address for reading data.



Refer to the following figure for a set position of the Setting Switch.

Example) When it sets "B".

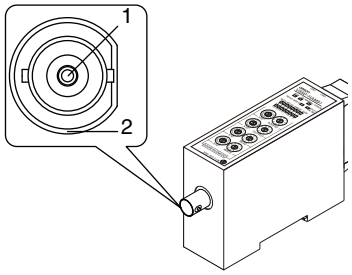
Item	Description
Setting method	Specify the memory address of the RF Tag in 4-digit hexadecimal. Example to specify an RF Tag memory address of 01A3 hex: "0" "1" "A" "3"
Setting range	0000 to FFFF hex (See note.) Default setting: 0000 hex

Note: The upper 8 bits will not be read if FFFF hex is specified for a16-bit read/write operation. All output bits will be OFF.

The setting of the access address setting switches is read only when the power supply is turned ON. Therefore, settings cannot be changed while the power is being supplied. Turn OFF the power supply before changing the settings.

■ Antenna Connector

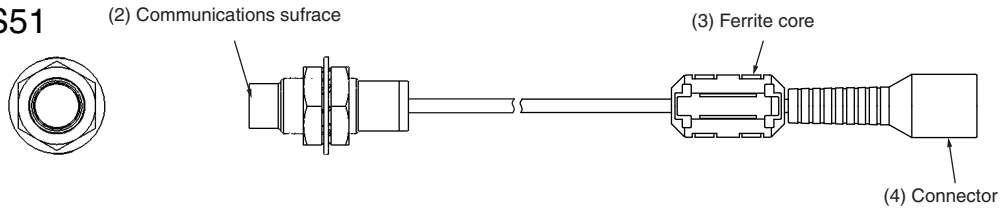
Connect this connector to the V680-series Antenna (described in this User's Manual).



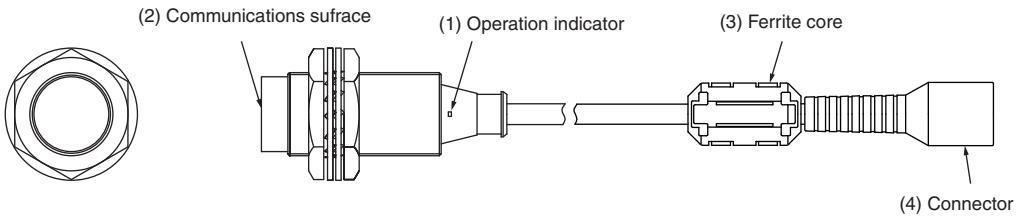
Pin No.	Name	Description	I/O
1	S	Signal line	---
2	GND	Analog ground	---

Antennas

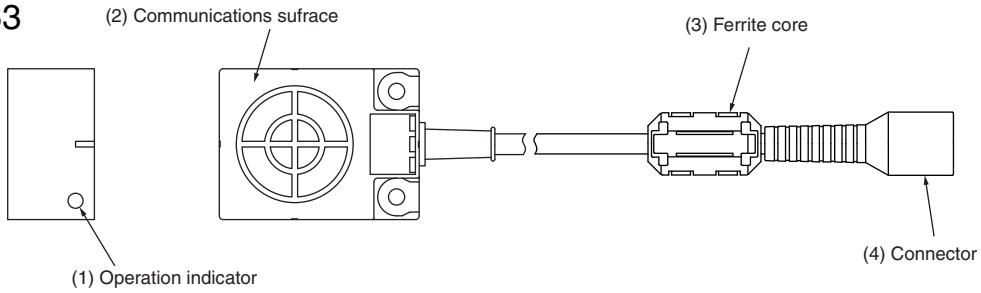
■ V680-HS51



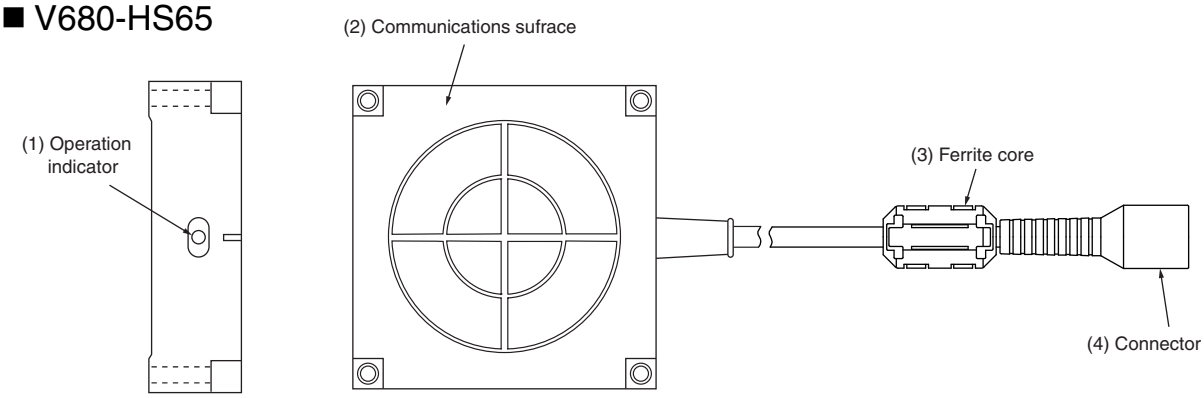
■ V680-HS52



■ V680-HS63



■ V680-HS65

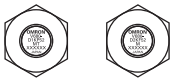


No.	Name	Description
1	Operation indicator	Lights when a signal is transmitted.
2	Communication surface	Mounted facing the RF Tags.
3	Ferrite core	
4	Connector	Connects to the ID Flag Sensor.

RF Tags

■ V680-D1KP52MT/-D2KF52M

■ V680-D1KP52M-BT01/-D2KF52M-BT01



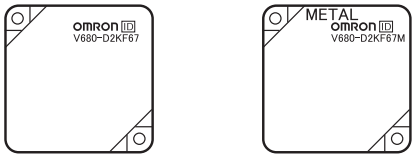
■ V680-D1KP52M-BT11/-D2KF52M-BT11

■ V680-D1KP53M

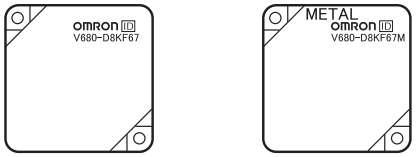
■ V680-D1KP66T/D1KP66MT

■ V680-D1KP66T-SP

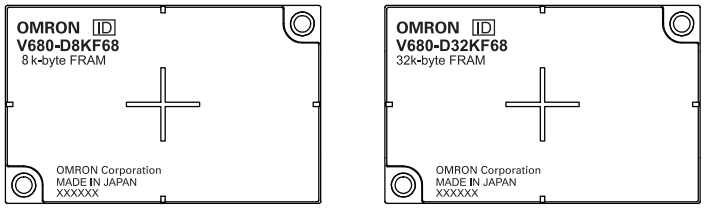
■ V680-D2KF67/-D2KF67M



■ V680-D8KF67/-D8KF67M



■ V680-D8KF68/-D32KF68



The ID Flag Sensor communications with the RF Tags through the Antenna to read and write data in the internal memory of the RF Tags.

The printed side is the communications surface. Mount the RF Tags with the communications surfaces facing the Antenna.

Section 3
Functions

Communications Mode	24
Optional Functions	26
Wire-saving Mode	28
Parity Check	29
Address Shift	30
Noise Measurement	31
Write Protection	32

Communications Mode

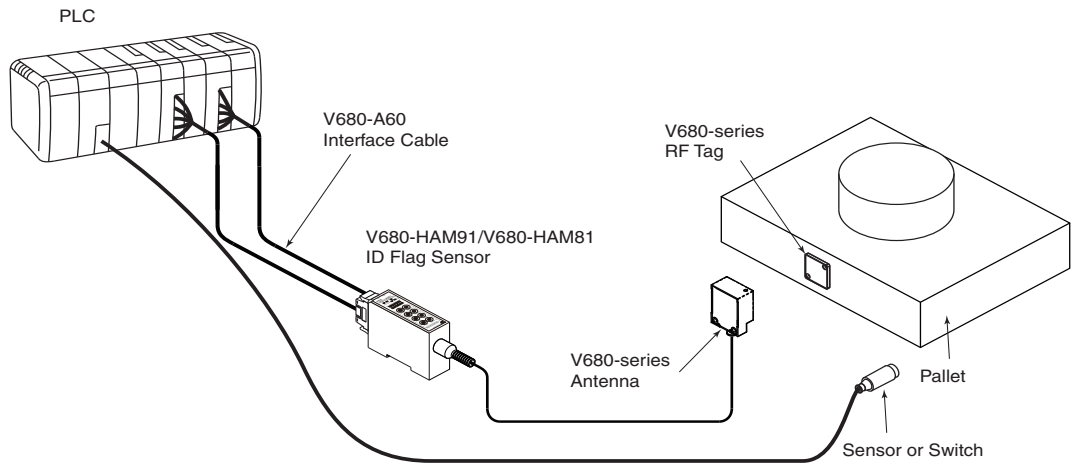
The ID Flag Sensor operates after reading the setting of the mode setting switches when the power supply is turned ON. Set the mode for communications with the RF Tags or set the Noise Measurement Mode on the access mode setting switch. There are three communications modes, each with different timing for completing communications with RF Tags: Mode 1, Mode 2, and Mode 3. Also, each of these modes has two other modes to specify when to start communications with the RF Tags: Trigger Mode and Auto Mode. Mode 2 and Mode 3 are compatible with the V600 series.

Communications end timing	Communications start timing	Access mode setting switch	Mode overview
Mode 1	Trigger Mode1	0: SYNC1	Standard modes
	Auto Mode1	1: AUTO1	
Mode 2	Trigger Mode2	2: SYNC2	Compatible with V600-HAR91/81 and HAM91/81.
	Auto Mode2	3: AUTO2	
Mode 3	Trigger Mode3	4: SYNC3	Compatible with V600-HAR92.
	Auto Mode3	5: AUTO3	

CHECK! Some of the functions supported in Mode 1 cannot be used in the V600-compatible modes.
For details, refer to *V600-Compatible Mode.*
p.164

Trigger Mode

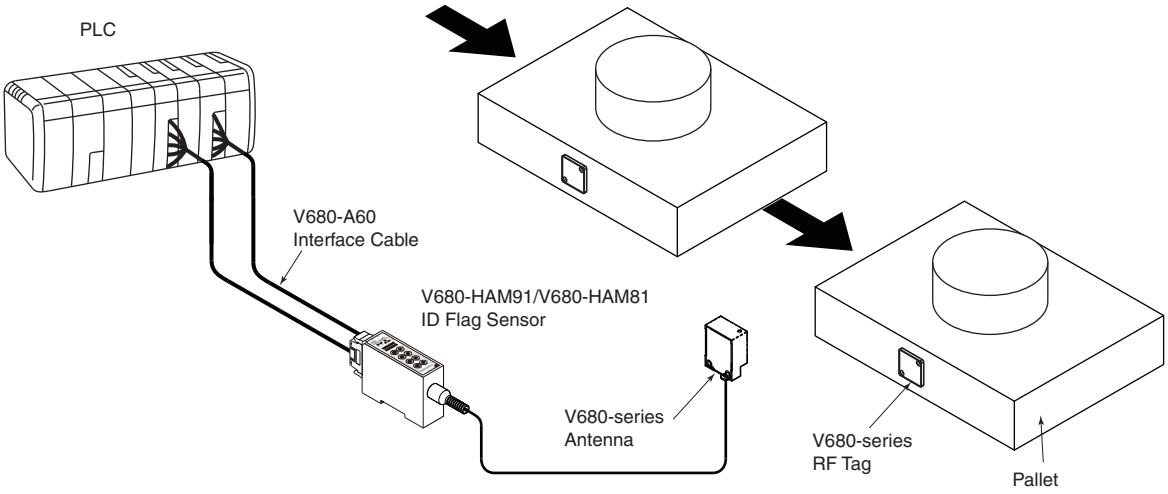
In Trigger Mode, an RF Tag on a workpiece or pallet in the communications area of the Antenna is detected by a sensor or a switch. A control signal (called the trigger signal) is output from the PLC to the ID Flag Sensor to trigger the ID Flag Sensor to begin communications with the RF Tag. The ID Flag Sensor reads the RF Tag data and outputs the results to the PLC.



CHECK! Only one Interface Cable (I/O connector CN1) is used to read RF Tag data. The address shift, noise check, and parity check functions, however, are not possible when only CN1 is used.

Auto Mode

In Auto Mode, the ID Flag Sensor automatically begins communications with a RF Tag on a workpiece or pallet when it enters the communications area of the Antenna, and then the ID Flag Sensor outputs the result to the PLC.



CHECK! Only one Interface Cable (I/O connector CN1) is used to read RF Tag data. The address shift, noise check, and parity check functions, however, are not possible when only CN1 is used.

Noise Measurement

The Noise Measurement Mode can be used to check if there is noise around the Antenna that is affecting communications with the RF Tag. When the power supply is turned ON with the access mode switch set to this mode, the noise around the Antenna will be measured and the result will be displayed on indicators and output to external outputs.

CHECK! Noise measurement can performed with the above mode setting or by turning ON the NOISE_IN external input when Trigger Mode 1 or Auto Mode 1 is being used. For details, refer to *Trigger Mode1 :Noise Measurement.*
p.61

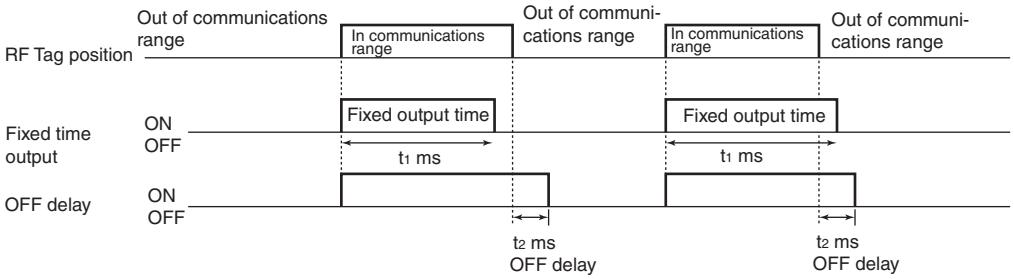
Optional Functions

The following optional functions can be enabled by using the mode setting switches (access mode setting, output mode setting, read mode setting, or write mode setting) and specifying the control signal.

Function	Description
Output time operation	Specified by setting the output mode.
Verification	Set the read mode to "VERIFY".
Wire saving	Set the read mode to "DATA READ2".
Write mode	Specified by setting the write mode.
Write protection	Specified using the WRITE_PROTECT external input.
Address shift	Specified using theADR0 to ADR2 external inputs.
Noise check	Specified using the NOISE_IN external input.

Output Time Operation

Set the output method and time for the normal completion output (NORMAL/STRB), error completion output ($\overline{\text{ERR}}$), and data outputs (OD0 to OD15). There are two output methods: OFF delay and fixed time.



- The output time operation specification depends on the communications mode. A setting error will occur if an output method that is not supported is set

Communications mode		Output method specification	Output rotary switch setting range
Standard modes	Trigger Mode 1	Designation not required. (See note1.)	Either from "0" to "9"
	Auto Mode 1	OFF delay	10 ms(“0“)/50 ms(“1“)/500 ms(“2“) OFFDELAY
V600-compatible modes	Trigger Mode 2	Fixed time	10 ms(“3“)/50 ms(“4“)/CONTINUOUS(“5“) (See note2.)
	Auto Mode 2	Fixed time	10 ms(“3“)/50 ms(“4“)/CONTINUOUS(“5“) (See note2.)
	Trigger Mode 3	OFF delay	10 ms(“0“)/50 ms(“1“)/500 ms(“2“) OFFDELAY
	Auto Mode 3	OFF delay	10 ms(“0“)/50 ms(“1“)/500 ms(“2“) OFFDELAY

Note1. : The output will continue in Trigger Mode 1 until the trigger input turns OFF.
2. : When it is set to "CONTINUOUS" at the FIXED TIME OUTPUT, it keeps OUTPUT until INHIBIT/TRIG input turns to OFF.

CHECK!

For detail timing of output time, refer to *Section 5 Control I/O Interface*, and *Section 7 Appendices* when using V600 compatible mode.

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Verification

The verification function compares the data (16 bits) that is input to the external data input lines (ID0 to ID15) with the actually data (16 bits) read from the RF Tag, and outputs the result to indicate whether the data matches or not. The result of the verification is output to the external data outputs (OD0: Match, OD7: Mismatch, OD1 to OD6 and OD8 to OD15: Not used.) The result can also be checked on the Data Display LED on the ID Flag Sensor.

Wire-saving Mode

The Wire-saving Mode enables reading data and detecting errors using only 16 external data outputs (OD0 to OD15). Control can be performed using one 16-point I/O Unit in a Programmable Controller.

For details, refer to *Wire-saving Mode*.

p.28

Write Mode

Specify the method for writing data to the RF Tag. Specify the mode to write 2 bytes (16 bits) or 1 byte (8 bits) at a time, or specify the mode to set or clear specified bits.

Write Protection

Write protection can be enabled to prevent product model numbers, model names, or other important data saved in RF Tags from being lost.

For details, refer to *Write Protection*.

p.32

Address Shift

The address set on the access address setting switches can be offset by the value specified by external data inputs ADR0 to ADR2. This function is useful for reading more 16 bits (2 bytes) of RF Tag data.

For details, refer to *Address Shift*.

p.30

Noise Measurement

This function can be used to check if there is noise around the Antenna that is affecting communications with the RF Tag. The noise measurement when you turn ON the NOISE_IN external input in Sync Mode 1 or Auto Mode 1. The operating mode called Noise Measurement Mode by setting the access mode setting switch to "6" is for measuring noise at startup.

For details, refer to *Noise Measurement*.

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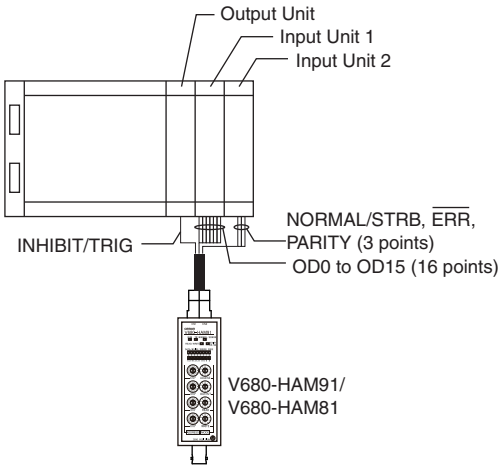
Wire-saving Mode

The Wire-saving Mode enables detecting read data signals and normal/error completion signals using only 16 data outputs (OD0 to OD15). Using this mode enables controlling reading 16-bit data using only one 16-point Input Unit for a PLC or a wire-saving device.

■ System Configuration Example: Combination and Usage of I/O Lines in Each Mode

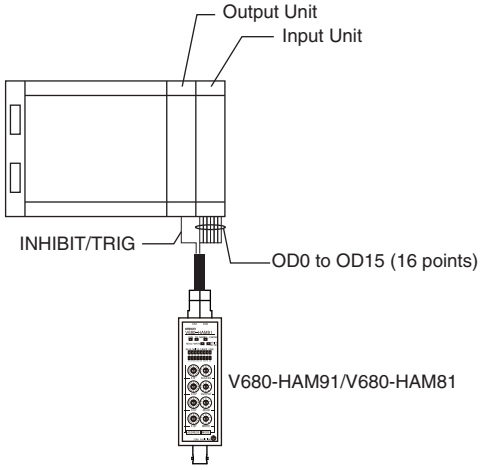
- Normal Read Wiring: DATA READ 1

  Number of Required I/O
  Output Units: 1
  Input Units: 2



- Wire-saving Read Wiring: DATA READ 2

  Number of Required I/O
  Output Units: 1
  Input Units: 1



- For Wire-saving Mode, outputting all zeros on the data lines (0000 hex) is used as communications control, and outputting all ones on the data lines (FFFF hex) is used as an error completion output. Normal completion (NORMAL/STRB) is detected by confirming that the output from the data lines is not all zeros (0000 hex) and not all ones (FFFF hex).
- All zeroes (0000 hex) and all ones (FFFF hex) cannot be used as data when Wire-saving Mode is used.
- Error codes cannot be output when an error completion occurs. The data indicators, however, will flash red to show the error code.
- The parity output is not connected and cannot be used.
- The Wire-saving Mode cannot be used when Trigger 2 or Auto 2 Mode is used. Attempting to do so will result in a settings error.

Parity Check

This function detects vertical parity in the data output on the data output lines (OD0 to OD15) and outputs the parity status. If the number of bits that are ON in the data output lines is even, then the parity output is OFF. If the number of bits that are ON in the data output lines is odd, then the parity output is ON. The parity check is performed for output data on the cable communications between the host device and the ID Flag Sensor. The parity check can be used to effectively perform simple checks for disconnected cables or wiring.

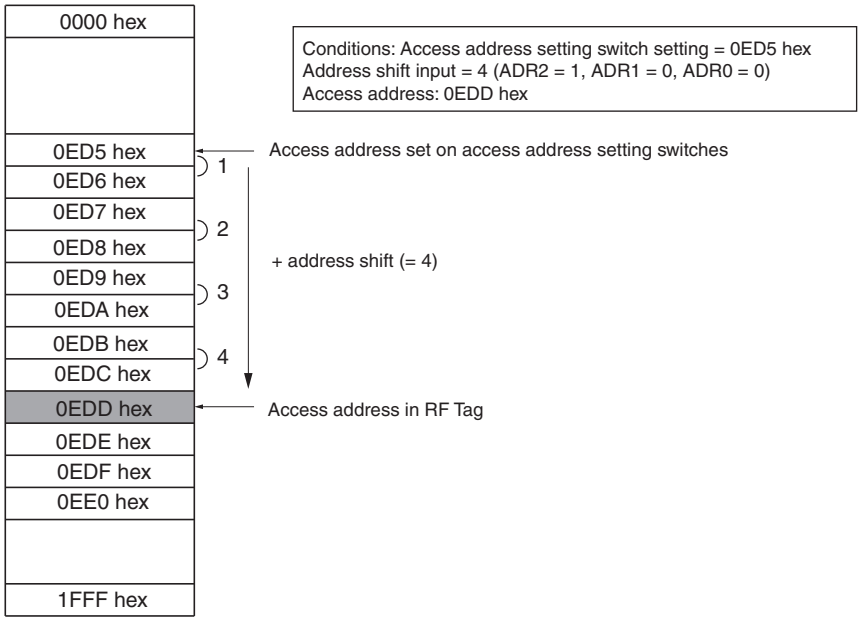
The parity check cannot be used in Trigger Mode 2 or Auto Mode 2. The ID Flag Sensor indicates a Setting Error.

p.164

Address Shift

The address set on the access address setting switches can be offset by the value specified by external data inputs ADR0 to ADR2 to change the access address. The address shift enables reading or writing to up to 16 access address (up to 128 bits) of RF Tag memory.

Address Specification Example with 8-kilobyte RF Tag



Note 1. An address error will occur if the address shift exceeds the maximum address setting (FFFF hex).
Example of Address Error

Access address setting switches:	FFFD hex
Address shift input:	5 (ADR2 = 1, ADR1 = 0, ADR0 = 1)
Access address:	Address error

2. The address will be shifted by blocks when the 1-Byte Write Mode is used.

Access address setting switches:	0010 hex
Address shift input:	3 (ADR2 = 0, ADR1 = 0, ADR0 = 1)
Access address:	0013 hex

CHECK!

The address shift function can be used only in Trigger 1 or Auto 1 Mode.

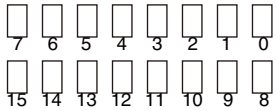
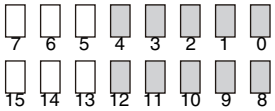
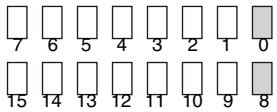
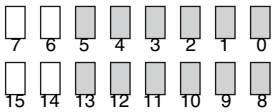
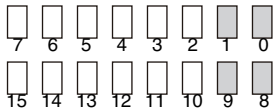
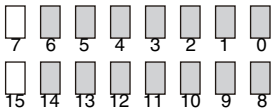
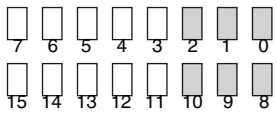
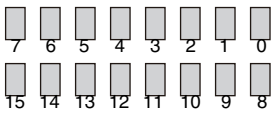
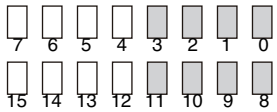
Noise Measurement

You can check whether noise that affects communications with RF Tags exists in the area where the Antenna and ID Flag Sensor are installed.

In Trigger Mode 1 or Auto Mode 1, noise measurement is performed by turning ON the NOISE_IN external input. The result of noise measurement will be output to the external data outputs when the NORMAL/STRB signal is turned ON after the measurement is performed.

The output will be on a scale of 00 to 99 for the strength of the noise affecting the Antenna. The external data output lines will output the value converted to hexadecimal. The measured noise strength is also displayed in eight levels on the Data Display LED, and so it can be checked directly on the ID Flag Sensor.

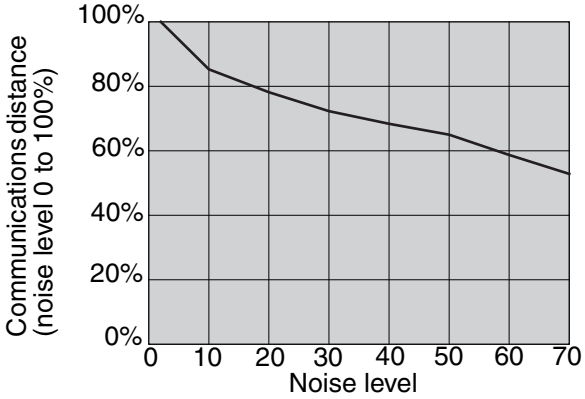
Relation between Result Output and Data Display LED

Result output	Data indicator status	Result output	Data indicator status
“00” to “10”		“55” to “65”	
“11” to “21”		“66” to “76”	
“22” to “32”		“77” to “87”	
“33” to “43”		“88” to “99”	
“44” to “54”			

Example of Results Output and Influence on Communications Distance

CHECK!

The values given for the influence of the noise level obtained from noise measurement and the communications distance are for reference only. The results depend on the type of Antenna and RF Tag used, and differences in the noise environment. Be sure to check carefully when installing the system.



▪ Measurement Conditions

Antenna : V680-HS63

RF Tag : V680-D1KP66T(non-metallic mounting)

Command 4-byte write

Write Protection

The write protection function protects important data stored in the memory of a RF Tag, such as the product model or type, from being overwritten inadvertently.
Enable the write protection function after writing important data as described in this section.

Setting Write Protection

For the write protection function to be effective, it must be enabled in both the ID Flag Sensor settings and the RF Tag settings.

CHECK!

Write protect enable/disable settings is effective only TRIGGER MODE 1 and AUTO MODE 1.
Write protect is always enabled at the TRIGGER MODE 2 and AUTO MODE 2.
The method of write protect for TRIGGER MODE 2 and AUTO MODE 2 confirms to the V600 series.
Details of *Write Protect function for V600-compatible Mode*, refer to the *Section 7 Appendices*
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1. Enabling the Write Protection in the ID Flag Sensor

Write protection can be enabled by turning OFF pin 6 (NOISE_IN/WRITE PROTECT) of I/O connector CN2.
NOISE_IN/WRITE PROTECT input is effective as WRITE PROTECT input only when it specified write mode(R/W : ON).

2. Setting Write Protection for RF Tags

Write protection is set in the 4 bytes from RF Tag addresses 0000 hex to 0003 hex. Write protection for RF Tags is enabled in the most significant bit of address 0000 hex.

- Write-protect Bit (most significant bit of address 0000 hex)
  1: Write-protected (write protection enable)
  0: Not write-protected (write protection disable)

Memory Map for RF Tag Write Protection Settings

Address / Bit	7	6	5	4	3	2	1	0
0000 hex	Enable/ disable	Upper two digits of start address (00 to 7F)						
0001 hex	Lower two digits of start address (00 to FF)							
0002 hex	Upper two digits of end address (00 to FF)							
0003 hex	Lower two digits of end address (00 to FF)							

CHECK!

When write protection is not used, the above addresses can be used as user memory. If it is used as user memory, disable the write protection function of the ID Flag Sensor by turning ON pin 6 (NOISE_IN/WRITE PROTECT) of I/O connector CN2. NOISE_IN/WRITE PROTECT input must be OFF when reading the RF Tag. If it turns ON during reading operation, the ID Flag Sensor execute Noise level measurement.

- Addresses in RF Tag Memory That Can Be Write Protected
  Start address: 0000 hex to 7FFF hex
  End address: 0000 hex to FFFF hex

CHECK!

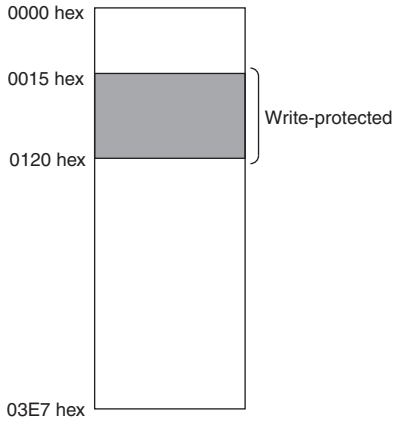
The write-protection setting area of the RF Tag cannot be write-protected.

Example of Write Protection

■ Start Address Is Lower Than the End Address

The memory area between the start address and end address will be write-protected.

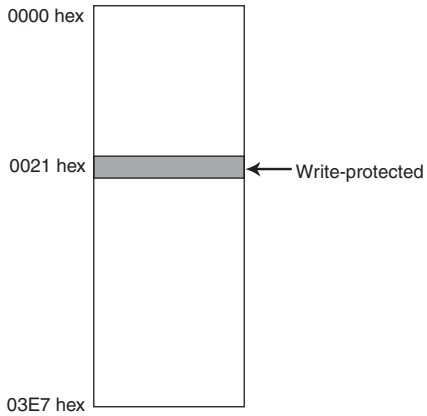
Address (hex)	Bit	Upper digits				Lower digits			
0000		1	0	0	0	0	0	0	0
		8				0			
0001		0	0	0	1	0	1	0	1
		1				5			
0002		0	0	0	0	0	0	0	1
		0				1			
0003		0	0	1	0	0	0	0	0
		2				0			



■ Start Address Is Equal to End Address

Only the selected address (one byte) will be write-protected.

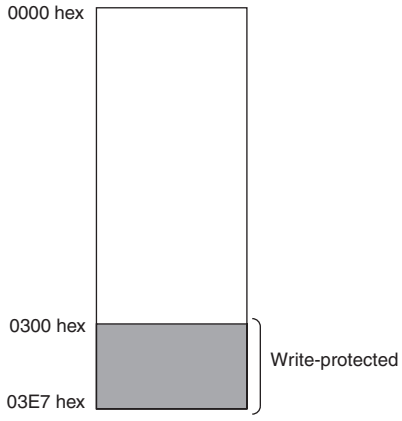
Address (hex)	Bit	Upper digits				Lower digits			
0000		1	0	0	0	0	0	0	0
		8				0			
0001		0	0	1	0	0	0	0	1
		2				1			
0002		0	0	0	0	0	0	0	0
		0				0			
0003		0	0	1	0	0	0	0	1
		2				1			



■ End Address Is Higher than the Last RF Tag Address

The memory area between the start address and the last RF Tag address will be write-protected.

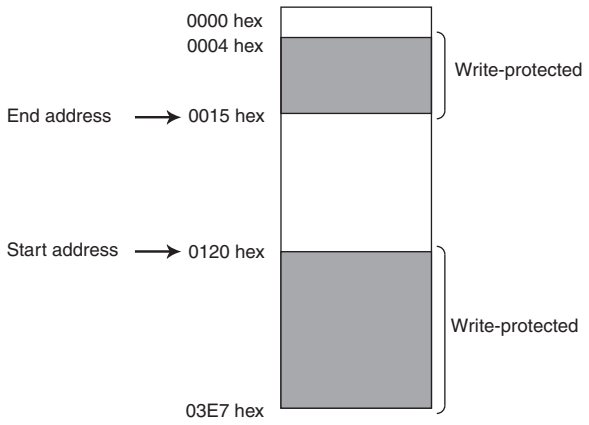
Address (hex)	Bit	Upper digits				Lower digits			
0000		1	0	0	0	0	0	1	1
		8				3			
0001		0	0	0	0	0	0	0	0
		0				0			
0002		0	0	0	0	0	0	1	1
		0				3			
0003		1	1	1	1	1	1	1	1
		F				F			



■ Start Address Is Higher Than End Address

The memory area between the start address and the last RF Tag address, as well as the area between 0004 hex and the end address will be write-protected.

Address (hex)	Bit	Upper digits				Lower digits			
0000		1	0	0	0	0	0	0	1
		8				1			
0001		0	0	1	0	0	0	0	0
		2				0			
0002		0	0	0	0	0	0	0	0
		0				0			
0003		0	0	0	1	0	1	0	1
		1				5			



Disabling Write Protection

■ Disabling Write Protection for Part of the RF Tags

Set the uppermost bit of 0000 hex to 0.

■ Disabling All Write Protection for the Whole RFID system

Turn ON pin 6 (NOISE_IN/WRITE PROTECT) of the I/O connector on the ID Flag Sensor.

CHECK!

Caution When Using Write Protection:
The write protection function is an OMRON ID Flag Sensor function. It cannot be used with RFID reader/writer manufactured by other companies.

CHECK!

Write protect enable/disable settings is effective only TRIGGER MODE 1 and AUTO MODE 1.
Write protect is always enabled at the TRIGGER MODE 2 and AUTO MODE 2.
TRIGGER MODE 3 and AUTO MODE 3 is not supported Write function itself.

Section 4
Installation, Connections, and Wiring

ID Flag Sensor	36
Installing Antennas	41
Installing RF Tags	44

ID Flag Sensor

Installation

To ensure full functionality of the ID Flag Sensor, follow the instructions provided in this section for installation.

■ Installation Site

Do not install the ID Flag Sensor in the following locations.

- Locations exposed to ambient temperatures that are not between −10 and 55°C or where there are radical temperature changes resulting in condensation
- Locations exposed to humidity that is not between 25% and 85%
- Locations subject to corrosive gas, flammable gas, dust, salt, or metal powder
- Locations that will expose the ID Flag Sensor to direct vibration or shock
- Locations exposed to direct sunlight
- Locations exposed to spray of water, oil, or chemicals
- Locations more than 2,000 m above sea level

■ Mounting in a Panel

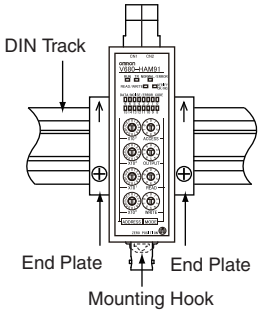
The ID Flag Sensor can be used at an ambient temperature range of −10 to 55°C. Be sure to observe the following precautions.

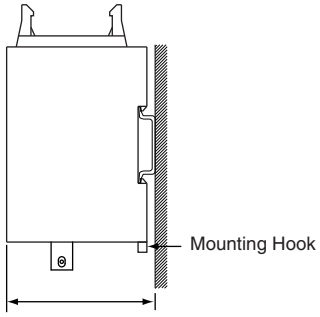
- Make sure that the Unit is provided with sufficient ventilation space.
- Do not install the Unit close to heaters, transformers, or large-capacity resistors that radiate excessive heat.

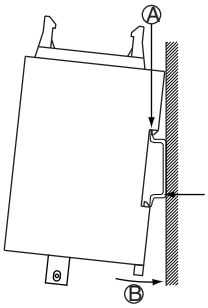
■ Installation Method

The ID Flag Sensor is to be mounted to a DIN Track. Mount the DIN Track, and then mount the ID Flag Sensor to the DIN Track.

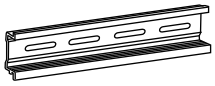
1. First hook the ID Flag Sensor Unit to part A, then press it in direction B to mount it to the DIN Track.
2. To disconnect the ID Flag Sensor Unit from the DIN Track, pull the mounting hook downwards, and then lift the Unit upwards.



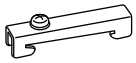




DIN Track
PFP-100N2 (OMRON)

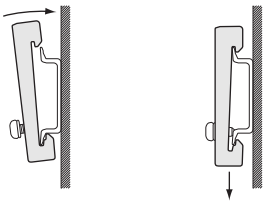


End Plate
PFP-M (OMRON)



CHECK!

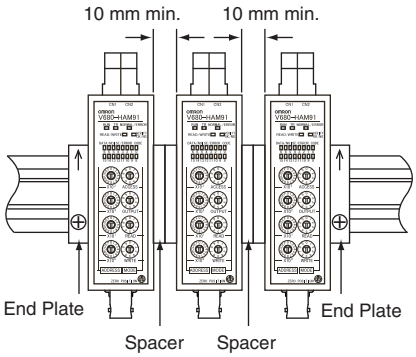
Attaching the End Plates:
To mount an End Plate easily, first hook the bottom of the End Plate and then hook the top on the DIN Track, pull the End Plate downwards and tighten the screw.
Recommended tightening torque: 1.2 N·m.



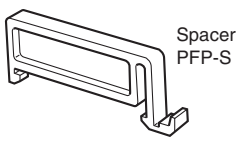
■ Mounting Interval

The ID Flag Sensor Units will generate heat if they are mounted side-by-side.

Leave space between Units of at least 10 mm.



Use at least 2 OMRON DIN Track Spacers. (Each Spacer is 5 mm wide)



Connection and Wiring

■ Interface Cable

▪ INPUT/OUTPUT controls

- When using a solid-state output with the maximum switching current rating over 1A , there is a possibility of causing External Input Errors due to the delay of rise /fall time of output signal. Consider this when selecting the solid-state output.
- When using a contact output, consider chattering and the minimum switching current.
- When connecting an inductive load or an electrical device that tends to generate noise to the output, connect a diode in parallel with the load. Connect the cathode side of the diode to the positive side of the power supply.

⚠WARNING

▪ Power Supply Voltage

- Do not impose an AC(100VAC to 240VAC) power supply or any voltage exceeding the rated voltage range on the V680-HAM91/-HAM81. Unsuitable power supplies may cause the V680-HAM91/-HAM81 to explode or bum.

▪ Load Short-circuiting

- Do not short-circuit the load connected to the V680-HAM91/-HAM81 or connect power to the load. Any of these may cause the V680-HAM91/-HAM81 to explode or bum.

⚠WARNING

- Do not mis-wire and do not reverse polarity of the power supply connected to the V680-HAM91/-HAM81. Wiring mistakes, including reversed power supply polarity may cause the V680-HAM91/-HAM81 to explode or bum.

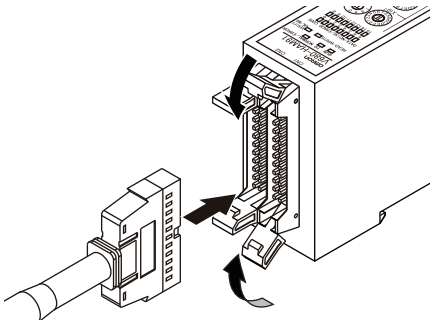
▪ Connecting and Disconnecting the ID Flag Sensor

Mounting Procedure

CHECK!

Line up the direction of the triangle mark on the connectors of the ID Flag Sensor and the interface cable, and then press in the connector of the interface cable.

The lock will engage when the interface cable is pressed into the connector on the ID Flag Sensor.

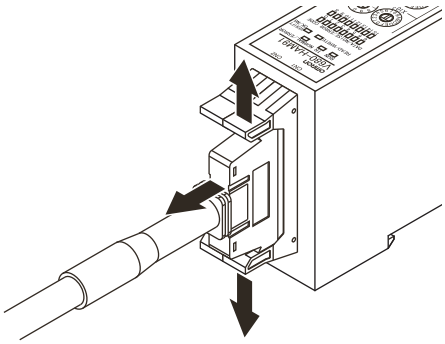


Removal Procedure

CHECK!

To remove the connector of the interface cable, always hold the connector and pull it out in a straight line. Pulling the cable may result in severing the cable or other product failure.

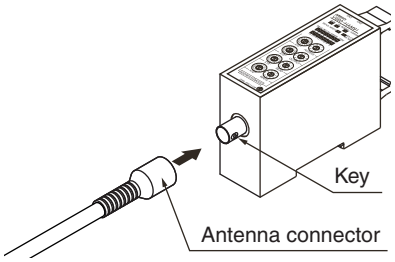
Unlock the connector on the ID Flag Sensor and pull out the connector of the interface cable.



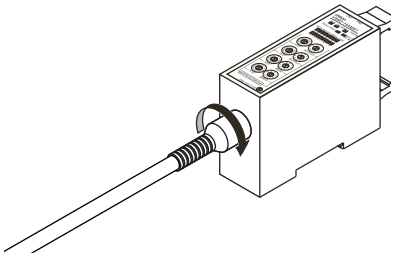
■ Antenna Connector

▪ Mounting the Antenna

1. Hold the connector part of the Antenna and insert it into the Antenna port while matching the key on the ID Flag Sensor with the groove on the connector.

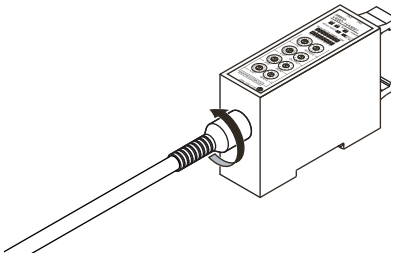


2. Turn the connector clockwise to lock it in place.

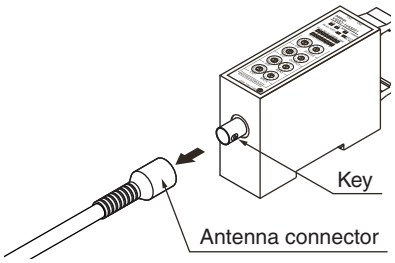


▪ Removing the Antenna

1. Turn the connector in counterclockwise to release the lock.



2. Pull the connector straight out of the port.



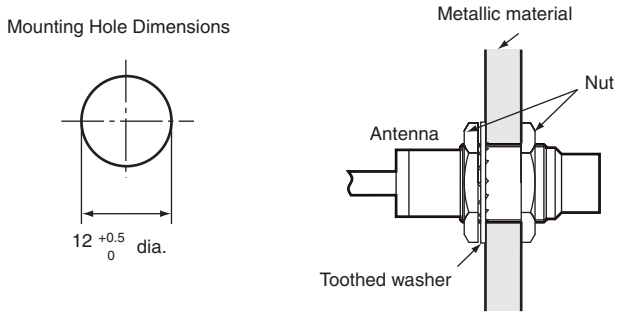
CHECK!

The connector cannot be removed without turning it to release the lock.
If the cable is pulled without releasing the lock, it may cause the cable or wires to break. Make sure that the lock is released before pulling out the connector.

Installing Antennas

V680-HS51

Install the Antenna using the nuts and toothed washer that are provided on both sides of the mounting material, as shown in the diagram below.



CHECK! For details on installing Antennas, refer to *Antenna Mounting Precautions*.

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CHECK! Securely tighten the screws to a torque of 6 N·m.

V680-HS52

Install the Antenna using the nuts and toothed washers that are provided on both sides of the mounting material, as shown in the diagram below.

CHECK! When the Antenna is mounted to a metallic material, the communications distance will be reduced by approximately 10% compared with mounting to a non-metallic material.
For details on the effect of metal surrounding the Antenna, refer to *Antenna Mounting Precautions*.

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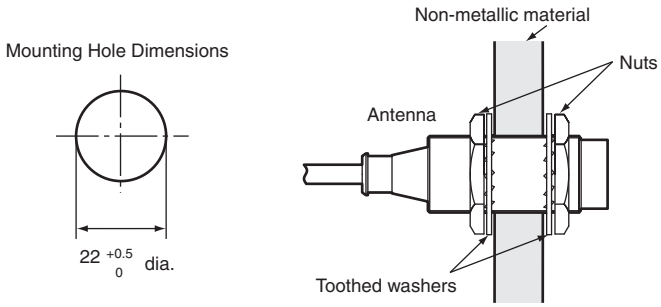
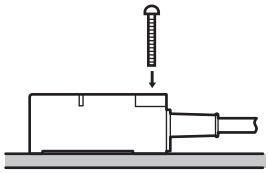
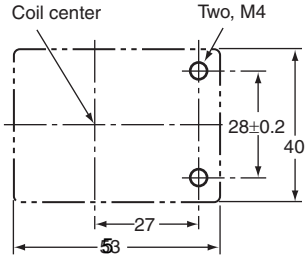


CHECK! Securely tighten the screws to a torque of 40 N·m.

V680-HS63

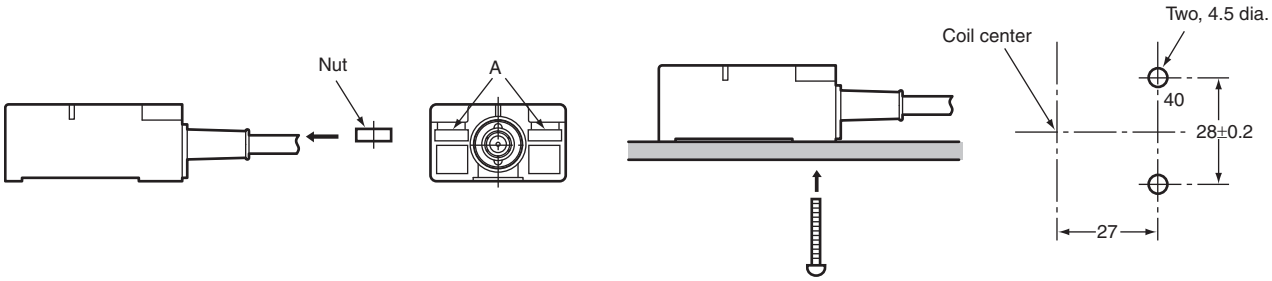
■ Installation from the Front





■ Installation from the Back

Insert the nuts that come with the Antenna into sections A.



CHECK! For details on installing Antennas, refer to *Antenna Mounting Precautions*.

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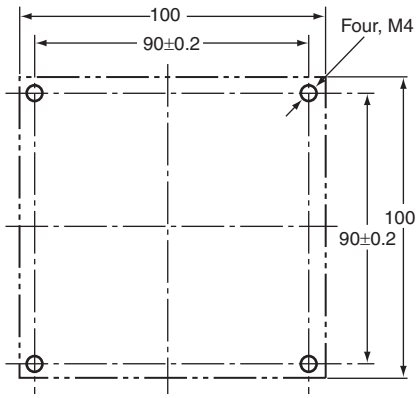
CHECK! Securely tighten screws to a torque of 1.2 N·m.

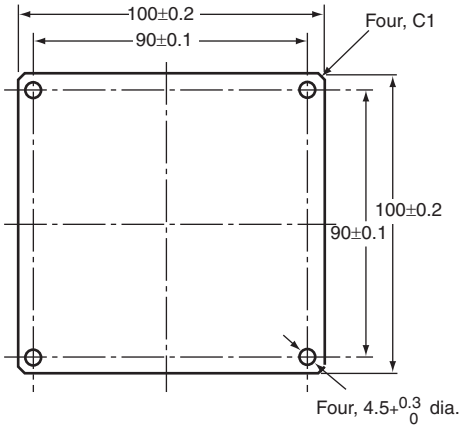
V680-HS65



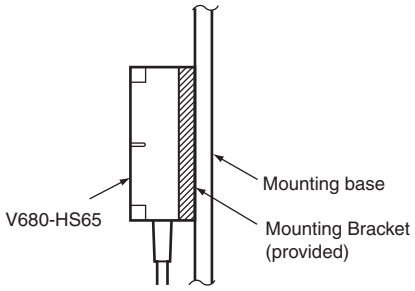
Use M4 screws and spring washers (in four places) for Antenna installation.

CHECK! Securely tighten screws to a torque of 0.7 to 1.2 N·m.

■ Mounting Bracket Dimensions (Provided Only with the V680-HS65)



Note: When installing the Antenna, mount it on the enclosed Mounting Bracket. The Mounting Bracket is not necessary, however, if the Antenna is mounted on a metal base that is larger than the Antenna (100 × 100 mm).



CHECK! For details on installing Antennas, refer to *Antenna Mounting Precautions*.

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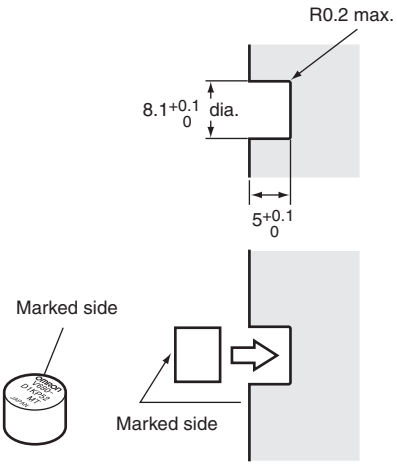
Installing RF Tags

V680-D1KP52MT

■ RF Tag Installation Direction

Mount the RF Tags as shown in the diagram on the right. The epoxy adhesives listed in the following table are recommended for the given temperature ranges.

Ambient operating temperature	Product name	Manufacturer
−40 to 70°C	Two-part Epoxy-compound Resin: TB2001 (main agent)/ TB2105C (curing agent)	Three Bond Co., Ltd.
	One-part Moisture-curing Elastic Adhesive TB1530	Three Bond Co., Ltd.
−40 to 150°C	One-part Epoxy Resin: TB2285	Three Bond Co., Ltd.
	Two-part Epoxy Resin: TB2087	Three Bond Co., Ltd.



CHECK! When installing RF Tags, refer to *RF Tag Mounting Precautions*.

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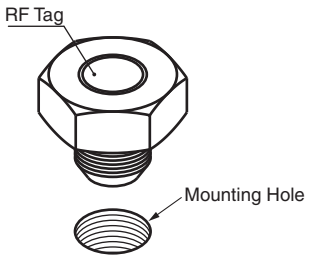
CHECK! When embedding the V680-D1KP52MT into a metal surface, use the V680-HS51/-HS52 Antenna. Communications will not be possible if the V680-HS63 Antenna is used.

V680-D1KP52M-BT01/-D1KP52M-BT11

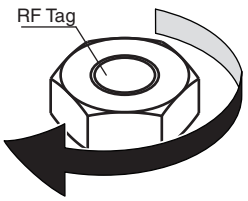
■ RF Tag Installation Direction

1. Turn the RF Tag clockwise, attach to the Mounting holes.



CHECK! V680-D1KP52M-BT01 is attached to the mounting holes in the M10, V680-D1KP52M-BT11 to the mounting holes in the M8.

2. Secure by tightening the bolts of the RF Tag.



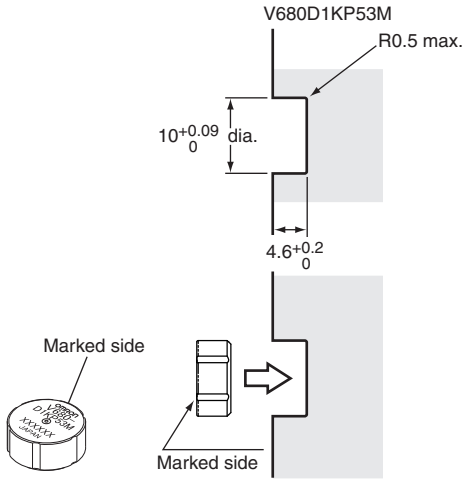
CHECK! When mounting the RF Tags, tighten the bolts to the following torques.
V680-D1KP52M-BT01: 24.5 N·m
V680-D1KP52M-BT11: 11 N·m

V680-D1KP53M

■ RF Tag Installation Direction

Mount the RF Tags as shown in the diagram on the right. The epoxy adhesives listed in the following table are recommended for the given temperature ranges.

Ambient operating temperature	Product name	Manufacturer
−40 to 70°C	Two-part Epoxy-compound Resin: TB2001 (main agent)/ TB2105C (curing agent)	Three Bond Co., Ltd.
	One-part Moisture-curing Elastic Adhesive TB1530	Three Bond Co., Ltd.
−40 to 150°C	One-part Epoxy Resin: TB2285	Three Bond Co., Ltd.
	Two-part Epoxy Resin: TB2087	Three Bond Co., Ltd.



CHECK! When installing RF Tags, refer to *RF Tag Mounting Precautions*.

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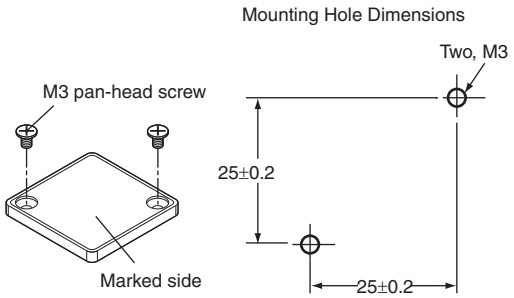
CHECK! When embedding the V680-D1KP53M into a metal surface, use the V680-HS51/-HS52 Antenna. Communications will not be possible if the V680-HS63 Antenna is used.

V680-D1KP66T

■ Mounting on Non-metallic Material

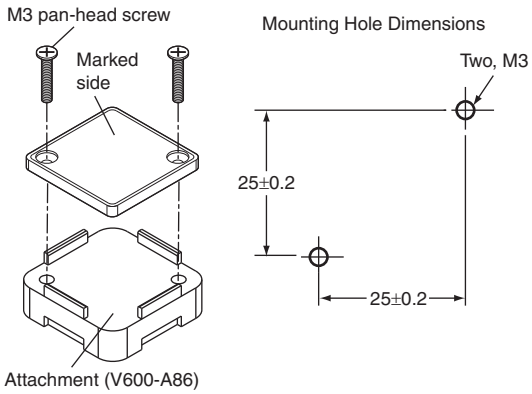
Mount the RF Tag using M3 pan-head screws from the marked side.

Tightening torque: 0.3 to 0.5 N·m



■ Mounting on Metallic Material

Communications distance will decrease if there is metal on the back of the V680-D1KP66T RF Tag. If the RF Tag is to be used mounted to metallic material, use the separately sold special attachment (V600-A86) or a non-metallic spacer (e.g., plastic or resin).



CHECK! When installing RF Tags, refer to *RF Tag Mounting Precautions*.

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CHECK! Refer to *Effect of Metal on Back of RF Tags (Reference)* for information on the effect of metal on the back of the V680-D1KP66T.

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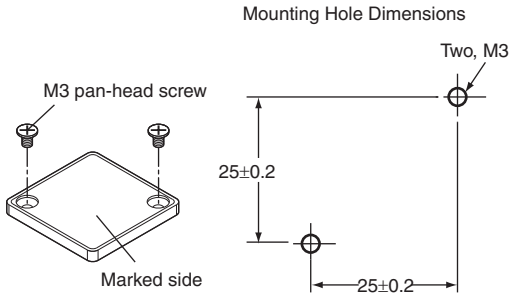
V680-D1KP66MT

Mount the RF Tag to metal using M3 pan-head screws from the marked side. Tighten the screws to a torque of 0.3 to 0.5 N·m..



CHECK! When installing RF Tags, refer to *RF Tag Mounting Precautions*.

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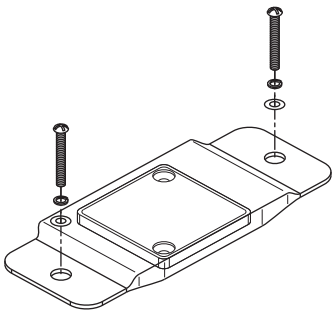
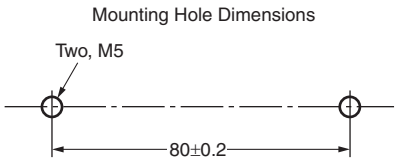
V680-D1KP66T-SP

Mount the RF Tag using M5 screws and washers. Tighten the screws to a torque of 1.2 N·m.
The installation direction of RF Tags is not restricted by the travel direction in respect to the Antenna.





CHECK! When installing RF Tags, refer to *RF Tag Mounting Precautions*.

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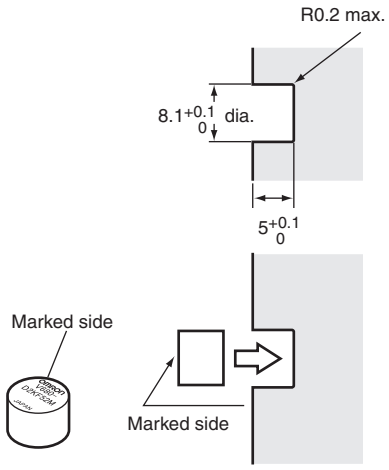
V680-D2KF52M

■ RF Tag Installation Direction

Mount the RF Tag as shown in the diagram on the right.
The epoxy adhesives listed in the following table are recommended for the given temperature ranges.

Ambient operating temperature	Product name	Manufacturer
−40 to 70°C	Two-part Epoxy-compound Resin: TB2001 (main agent)/ TB2105C (curing agent)	Three Bond Co., Ltd.
	One-part Moisture-curing Elastic Adhesive TB1530	Three Bond Co., Ltd.
−40 to 85°C	One-part Epoxy Resin: TB2285	Three Bond Co., Ltd.
	Two-part Epoxy Resin: TB2087	Three Bond Co., Ltd.



CHECK! When installing RF Tags, refer to *RF Tag Mounting Precautions*.

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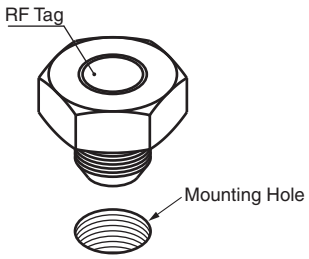
CHECK! When embedding the V680-D2KF52M into a metal surface, use the V680-HS51/-HS52 Antenna. Communciations will not be possible if the V680-HS63 Antenna is used.

V680-D2KF52M-BT01/-D2KF52M-BT11

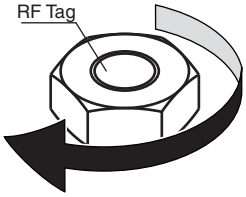
■ RF Tag Installation Direction

1. Turn the RF Tag clockwise, attach to the Mounting holes.



CHECK! V680-D2KF52M-BT01 is attached to the mounting holes in the M10, V680-D2KF52M-BT11 to the mounting holes in the M8.

2. Secure by tightening the bolts of the RF Tag.

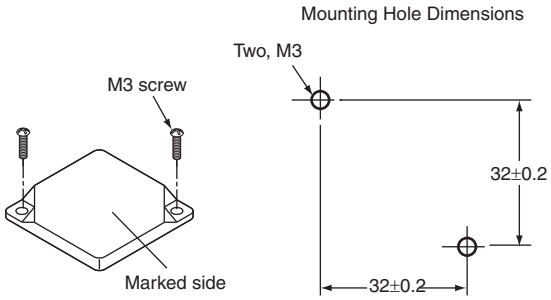


CHECK! When mounting the RF Tags, tighten the bolts to the following torques.
V680-D2KF52M-BT01: 24.5 N·m
V680-D2KF52M-BT11: 11 N·m

V680-D2KF67/-D2KF67M

■ RF Tag Installation Direction

Secure the RF Tag with M3 screws. Tighten the screws to a torque of 0.6 N·m.



CHECK! When installing RF Tags, refer to *RF Tag Mounting Precautions*.

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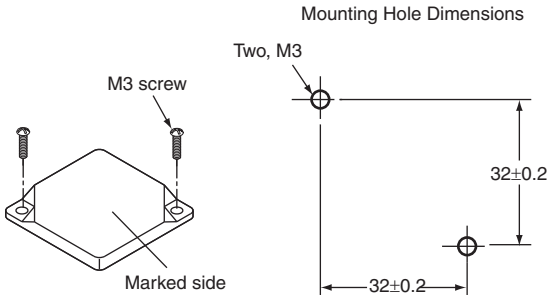
V680-D8KF67/-D8KF67M

■ RF Tag Installation Direction

Secure the RF Tag with M3 screws. Tighten the screws to a torque of 0.6 N·m.



CHECK! When installing RF Tags, refer to *RF Tag Mounting Precautions*.

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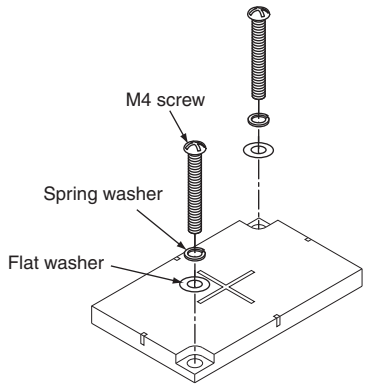
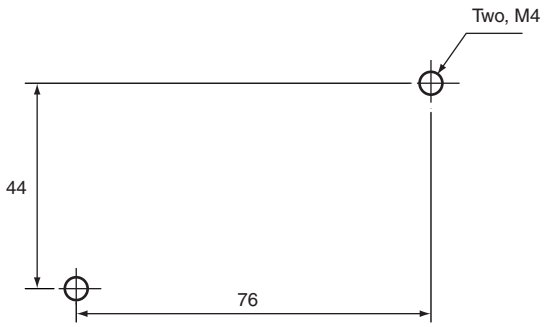
V680-D8KF68/-D32KF68

■ RF Tag Installation Direction

Secure the RF Tag with M4 screws. Tighten the screws to a torque of 0.7 to 1.2 N·m.





CHECK! When installing RF Tags, refer to *RF Tag Mounting Precautions*.

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MEMO

Section 5
Control I/O Interface

I/O Interface Control	52
I/O Control Flow	53
Timing Charts	54
Sample Programming	63

I/O Interface Control

The V680-series ID Flag Sensor can be connected to a PLC, I/O Terminal, B7A-series Link Terminal, DeviceNet device, or other host device. This section describes operations for connecting to and communicating with these devices.

Overview of Communications Modes

Use the access mode setting switch to set the communications mode for RF Tag communications. There are three communications modes, each with different timing for completing communications with RF Tags: Mode 1, Mode 2, and Mode 3. Also, each of these modes has two modes to specify when to start communications with the RF Tags: Trigger Mode and Auto Mode. Mode 2 and Mode 3 are compatible with the V600.

Communications end timing	Communications start timing	Access mode setting	Timing Charts	Mode overview
Mode 1	Trigger	0: SYNC MODE 1	p.54	Standard modes
	Auto	1: AUTO MODE 1	p.58	
Mode 2	Trigger	2: SYNC MODE 2	p.166	Modes compatible with V600-HAR91/81 and V600-HAM91/81
	Auto	3: AUTO MODE 2	p.169	
Mode 3	Trigger	4: SYNC MODE 3	p.172	Modes compatible with V600-HAR92
	Auto	5: AUTO MODE 3	p.174	

Some of the functions supported in Mode 1 cannot be used in the V600-compatible modes.

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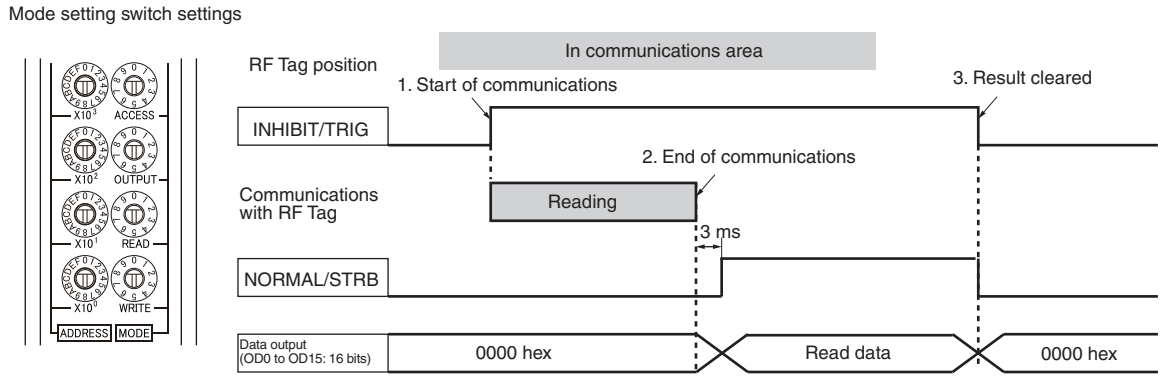
I/O Control Flow

The operation outline for ID Flag Sensor at Trigger Mode 1 and Auto Mode 1 are shown in this page. For detail timing of ID Flag Sensor , refer to the timing charts in this section. Control the ID Flag Sensor according to the timing charts.

Trigger Mode

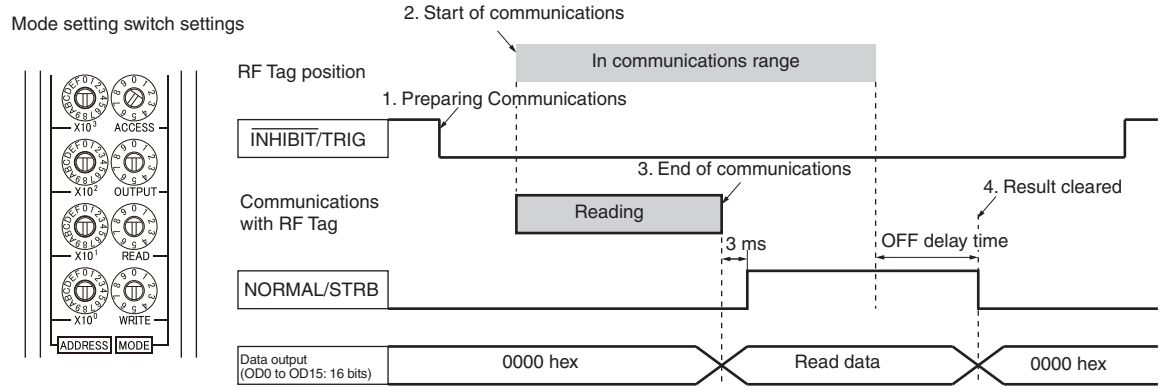
Example: Timing Chart for Trigger Mode 1, and Successful Read



1. Start of communications	Turn ON the INHIBIT/TRIG input to start communications with the RF Tag after confirming the RF Tag is in the communications area of the Antenna.
2. End of communications	If communications with the RF Tag are completed normally, the ID Flag Sensor will turn ON the NORMAL/STRB output and will output the read data to the data output bits (OD0 to OD15). The NORMAL/STRB output turns ON 3 ms after the data output lines. Read the data output after the NORMAL/STRB output turns ON.
3. Clearing results	When you turn OFF the INHIBIT/TRIG input, the NORMAL/STRB output will be turned OFF, and data output will be cleared to 0000 hex.

Auto Mode

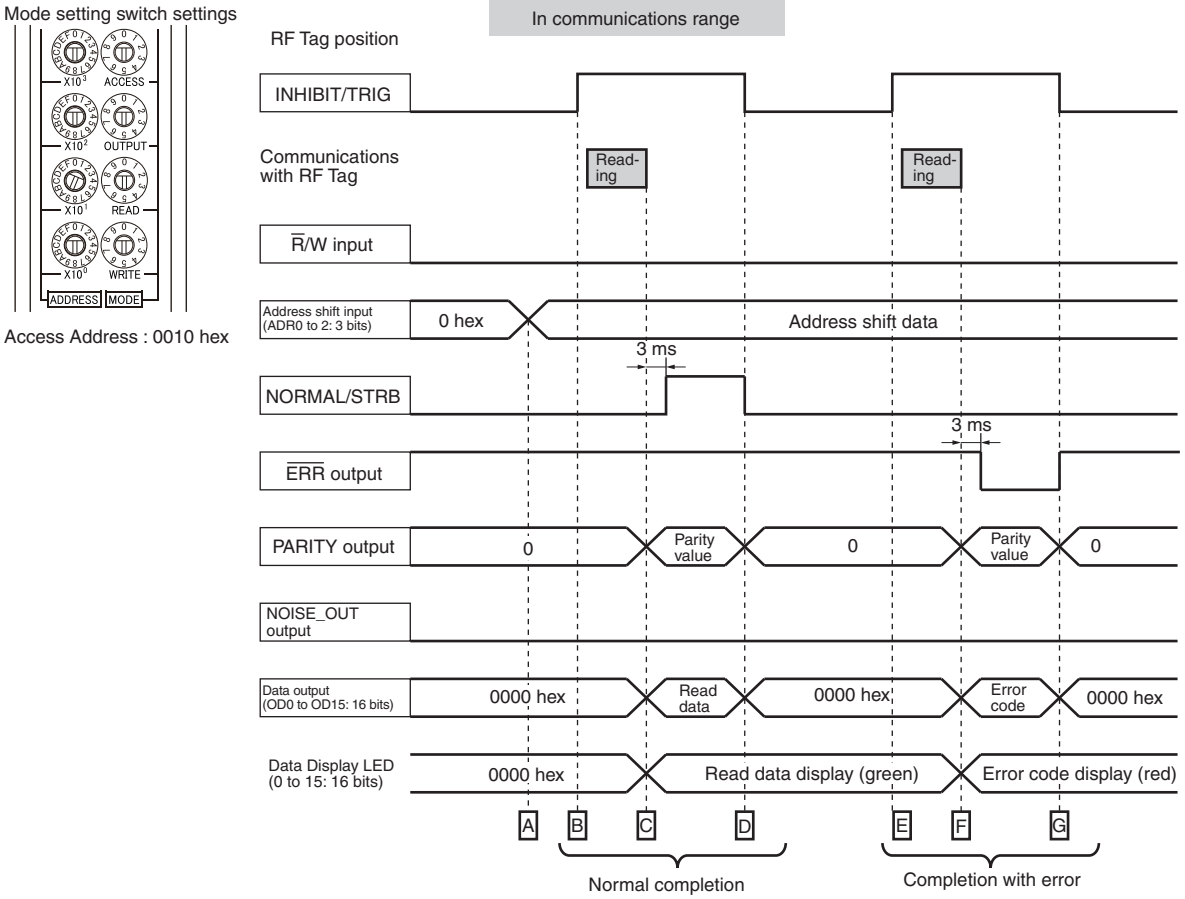
Example: Timing Chart for Auto Mode 1, and Successful Read



1. Preparations	Turn OFF the INHIBIT/TRIG input in advance to enable communications.
2. Start of communications	The ID Flag Sensor will start communications with the RF Tag when the RF Tag enters the communications area of the Antenna.
3. End of communications	If communications with the RF Tag are completed normally, the ID Flag Sensor will turn ON the NORMAL/STRB output and will output the read data to the data output bits (OD0 to OD15). The NORMAL/STRB output turns ON 3 ms after the data output lines. Read the data output after the NORMAL/STRB output turns ON.
4. Clearing results	After the RF Tag is out of the communications area of the Antenna, the NORMAL/STRB output and data output bits will be turned OFF after the time set for the OFF delay in the output mode time setting has elapsed.

Timing Charts

Trigger Mode 1: Read



A. Preparations — Before starting communications with the RF Tag, turn OFF the R/W input and set the address shift input bits (ADR0 to ADR2).

▪ Normal Completion of Communications with RF Tag

B. Start of communications — Turn ON the INHIBIT/TRIG input to start communications with the RF Tag after confirming the RF Tag is in the communications area of the Antenna.

C. End of communications — If communications with the RF Tag are completed normally, the ID Flag Sensor will turn ON the NORMAL/STRB output, store the parity value in the PARITY output, and store the read data in the data output bits (OD0 to OD15). The Data Display LED(0 to 15) corresponding to the read data will be lit green.

D. Clearing results — When you turn OFF the INHIBIT/TRIG input, the NORM/STRB output will be turned OFF, the parity value (0) will be set on the PARITY output, and the data output bits (OD0 to OD15) will be cleared to 0000 hex.

▪ Error Completion of Communications with RF Tag

E. Start of communications — Turn ON the INHIBIT/TRIG input to start communications with the RF Tag.

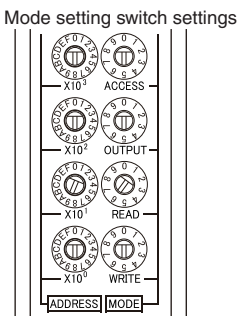
F. End of communications — If communications with the RF Tag are completed with an error(No RF Tag error), the ID Flag Sensor will turn ON "0" the ERR output, store the parity value in the PARITY output, and store the error code in the data output bits (OD0 to OD15). The data indicators (0 to 15) corresponding to the error code will be lit red.

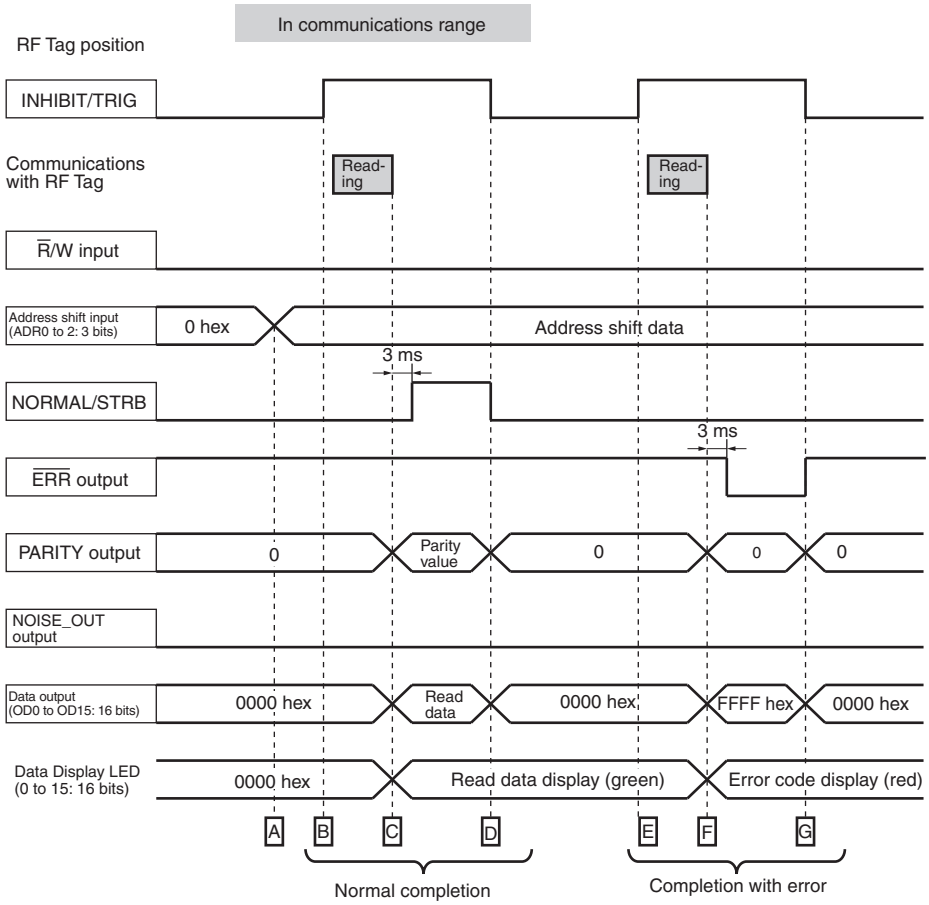
G. Clearing results — When you turn OFF the INHIBIT/TRIG input, the ERR output will be turned OFF "1", the parity value (0) will be set on the PARITY output, and the Data Display LED (OD0 to OD15) will be cleared to 0000 hex.

CHECK!

- Wait at least 10 ms after switching the R/W input line before performing next process.
- Switch the address shift input (ADR0 to ADR2) at least 10 ms before accessing the RF Tag(e.g., at least 10 ms before turning ON the trigger input).
- Read the data output (OD0 to OD15) after the NORMAL/STRB output turns ON.

Trigger Mode1 : Read with Wire-saving Mode





A. Preparations — Before starting communications with the RF Tag, turn OFF the R/W input and set the address shift input bits (ADR0 to ADR2).

▪ Normal Completion of Communications with RF Tag

B. Start of communications — Turn ON the INHIBIT/TRIG input to start communications with the RF Tag after confirming the RF Tag is in the communications area of the Antenna.

C. End of communications — If communications with the RF Tag are completed normally, the ID Flag Sensor will turn ON the NORMAL/STRB output, store the parity value in the PARITY output, and store the read data in the data output bits (OD0 to OD15). The Data Display LED(0 to 15) corresponding to the read data will be lit green.

D. Clearing results — When you turn OFF the INHIBIT/TRIG input, the NORM/STRB output will be turned OFF, the parity value (0) will be set on the PARITY output, and the data output bits (OD0 to OD15) will be cleared to 0000 hex.

▪ Error Completion of Communications with RF Tag

E. Start of communications — Turn ON the INHIBIT/TRIG input to start communications with the RF Tag.

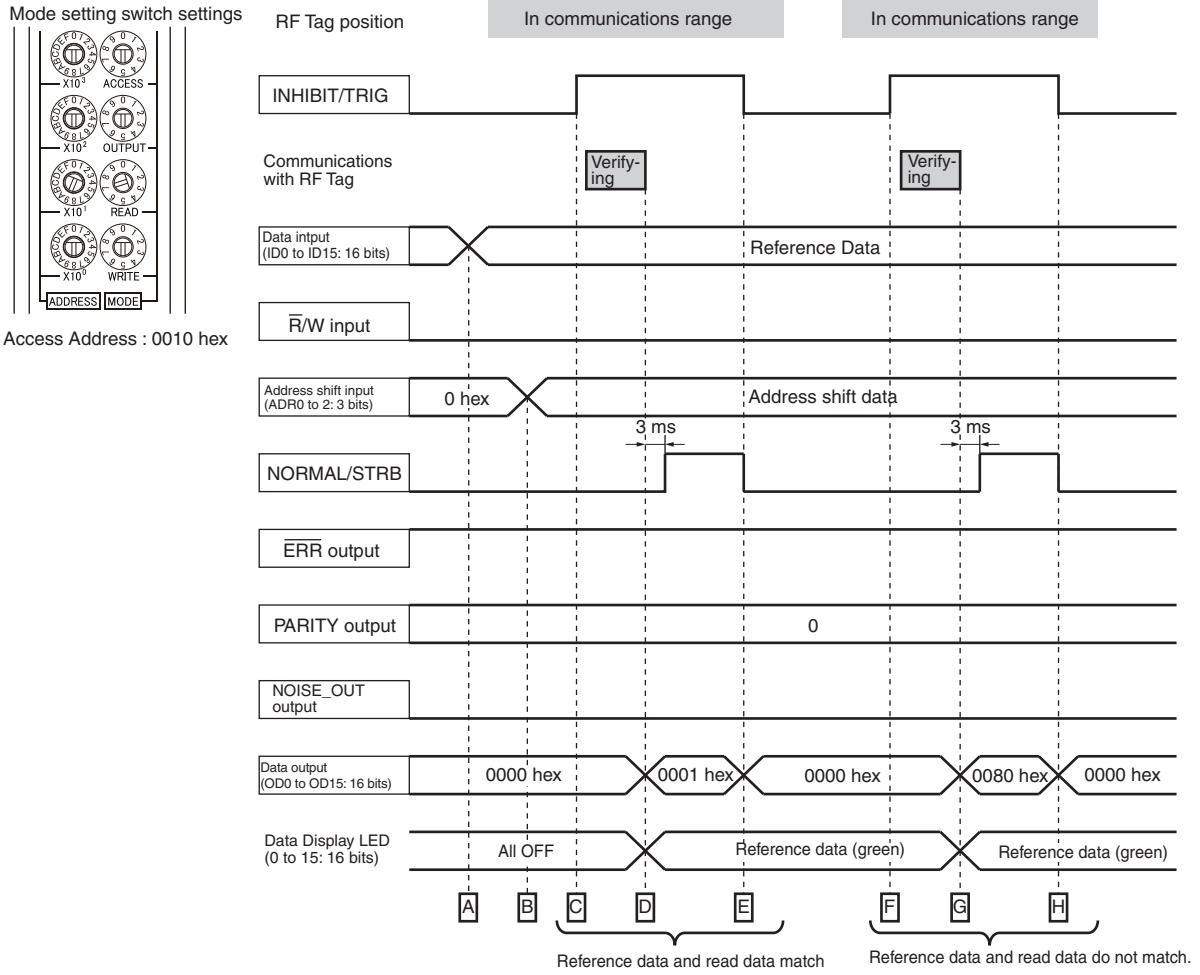
F. End of communications — If communications with the RF Tag are completed with an error(No RF Tag error), the ID Flag Sensor will turn ON "0" the ERR output, store the parity value in the PARITY output, and store FFFF hex (ON all bits) in the data output bits (OD0 to OD15). The Data Display LED (0 to 15) corresponding to the error code will be lit red.

G. Clearing results — When you turn OFF the INHIBIT/TRIG input, the ERR output will be turned OFF "1", the parity value (0) will be set on the PARITY output, and the data output bits (OD0 to OD15) will be cleared to 0000 hex.

CHECK!

- Wait at least 10 ms after switching the R/W input line before performing next process.
- Switch the address shift input (ADR0 to ADR2) at least 10 ms before accessing the RF Tag (e.g., at least 10 ms before turning ON the trigger input).
- If communications control will be performed using only data output lines without using the NORMAL/STRB output, for example, implement programming for a timer with a specified time, check the status of each data output line at each specified time, and read the outputs as data after the data is all zeros or all ones.
- All ones and all zeros of data outputs cannot be used as data.
- All data output bits will be ON when an error occurs. The Data Display LED (0 to 15) will flash the error code in red corresponding to the occurring error.

Trigger Mode1: VERIFY



A, B. Preparations — Turn OFF the R/W input before starting communications with the RF Tag, set reference data on the data input bits (ID0 to ID15), and set the address shift input bits (ADR0 to ADR2).

▪ Reference Data and Read Data Match

C. Start of communications — Turn ON the INHIBIT/TRIG input to start communications with the RF Tag after confirming the RF Tag is in the communications area of the Antenna.

D. End of communications — If communications with the RF Tag are completed normally, the ID Flag Sensor will turn ON the NORMAL/STRB output and the data output bit (OD0: data match). The VERIFY OK/NG indicator will be lit green, and the Data Display LED (0 to 15) corresponding to the reference data will be lit green.

E. Clearing results — When you turn OFF the INHIBIT/TRIG input, the NORMAL/STRB output and the data output bit (OD0) will be turned OFF.

▪ Reference Data and Read Data Mismatch

F. Start of communications — Turn ON the INHIBIT/TRIG input to start communications with the RF Tag after confirming the RF Tag is in the communications area of the Antenna.

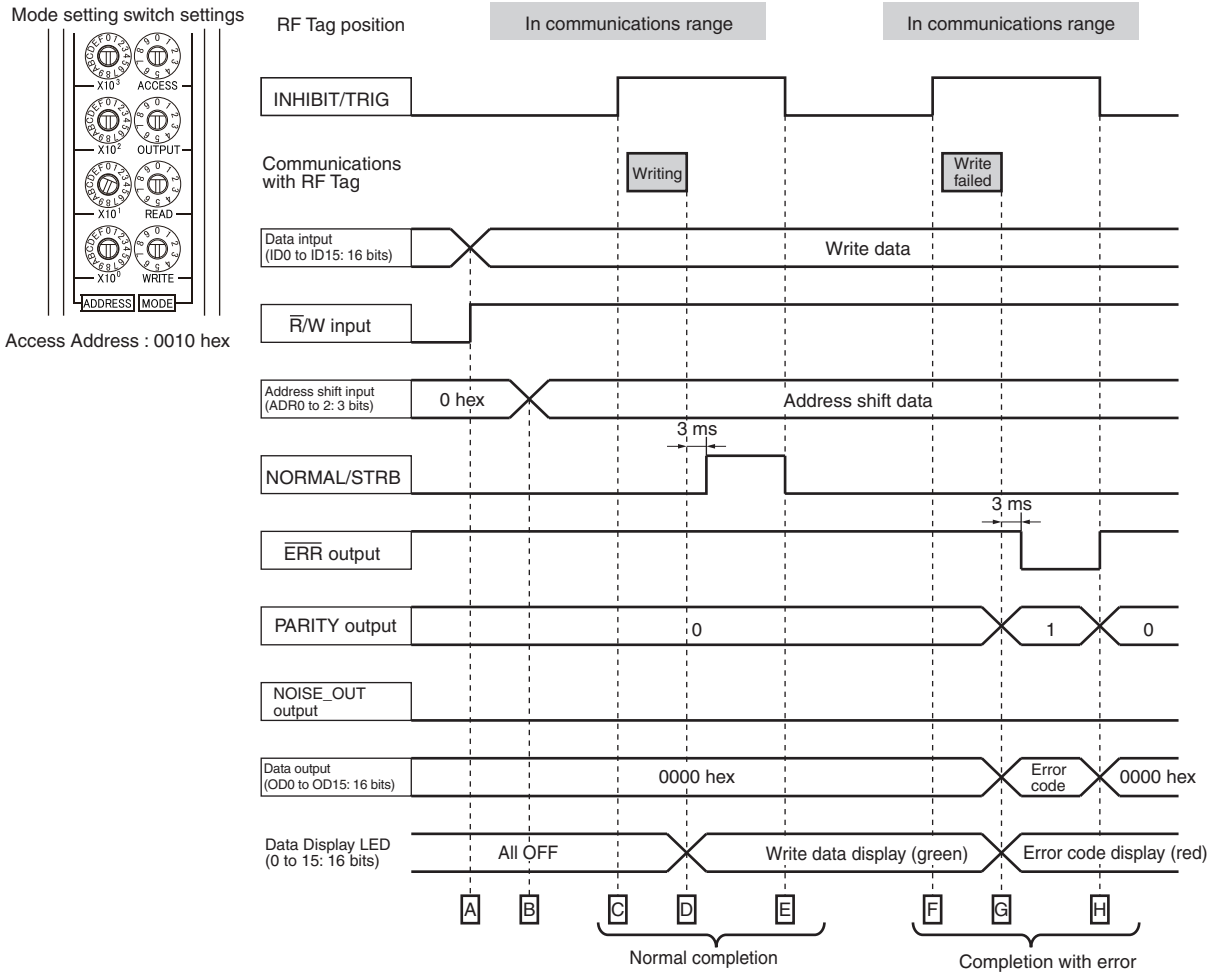
G. End of communications — If communications with the RF Tag are completed normally, the ID Flag Sensor will turn ON the NORMAL/STRB output and the data output bit (OD7: data mismatch). The VERIFY OK/NG indicator will be lit red, and the Data Display LED (0 to 15) corresponding to the reference data will be lit green.

H. Clearing results — When you turn OFF the INHIBIT/TRIG input, the NORMAL/STRB output and the data output bit (OD7) will be turned OFF.

CHECK!

- Wait at least 10 ms after switching the R/W input line before performing next process.
- Switch the address shift input (ADR0 to ADR2) at least 10 ms before accessing the RF Tag(e.g., at least 10 ms before turning ON the trigger input).
- Switch the reference data input (ID0 to ID15) at least 10 ms before accessing the RF Tag(e.g., at least 10 ms before turning ON the trigger input).
- Read the data output(OD0 to OD15) after the NORMAL/STRB output turns ON.

Trigger Mode1: Write



A, B. Preparations — Turn ON the R/W input before starting communications with the RF Tag, set the write data on the data input bits (ID0 to ID15), and set the address shift input bits (ADR0 to ADR2).

▪ Normal Completion of Communications with RF Tag

C. Start of communications — Turn ON the INHIBIT/TRIG input to start communications with the RF Tag after confirming the RF Tag is in the communications area of the Antenna.

D. End of communications — If communications with the RF Tag are completed normally, the ID Flag Sensor will turn ON the NORMAL/STRB output, and the Data Display LED (0 to 15) corresponding to the write data will be lit green.

E. Clearing results — When you turn OFF the INHIBIT/TRIG input, the NORMAL/STRB output will be turned OFF.

▪ Error Completion of Communications with RF Tag

F. Start of communications — Turn ON the INHIBIT/TRIG input to start communications with the RF Tag after confirming the RF Tag is in the communications area of the Antenna.

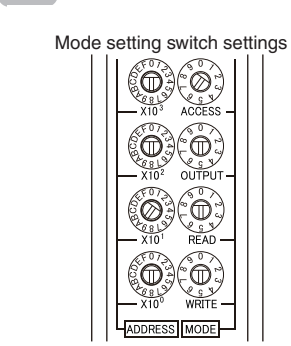
G. End of communications — If communications with the RF Tag are completed with an error (Write-verify error, Lock error, Write-protect error etc.), the ID Flag Sensor will turn ON "0" the ERR output, and the error code will be stored in the data output bits (OD0 to OD15). The Data Display LED (0 to 15) corresponding to the error code will be lit red.

H. Clearing results — When you turn OFF the INHIBIT/TRIG input, the ERR output will be turned OFF "1", and the data output bits (OD0 to OD15) will be cleared to 0000 hex.

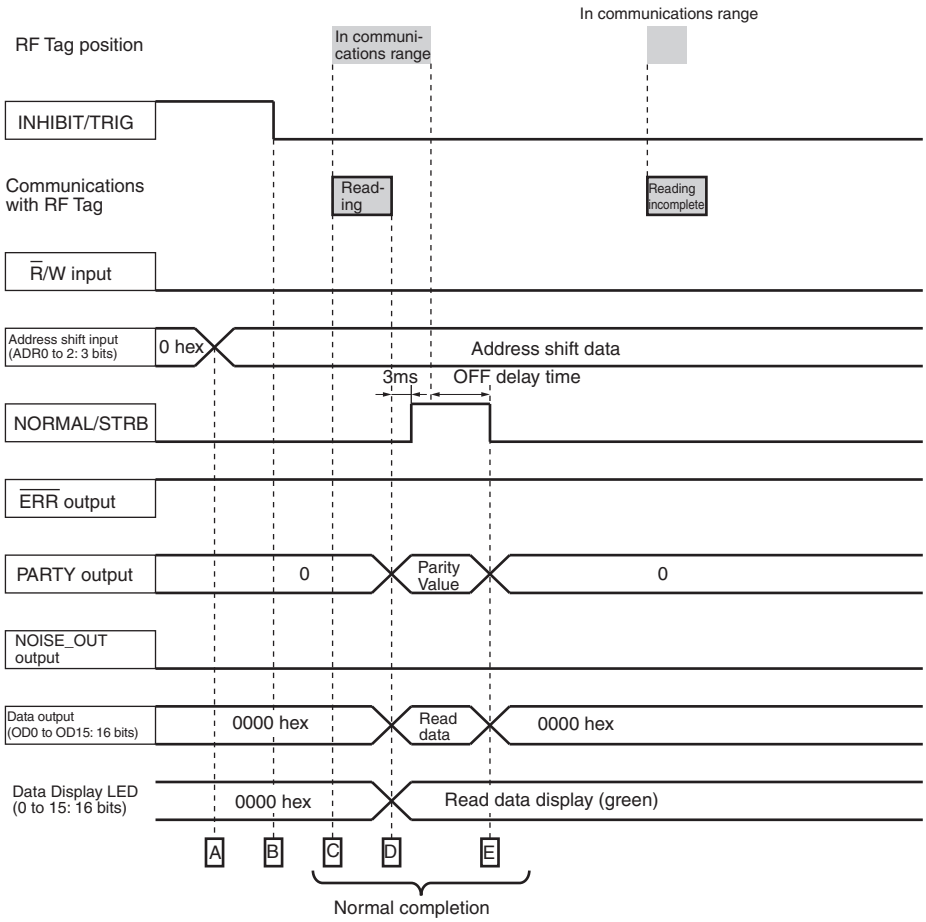
CHECK!

- Wait at least 10 ms after switching the R/W input line before performing next process.
- Switch the address shift input (ADR0 to ADR2) at least 10 ms before accessing the RF Tag (e.g., at least 10 ms before turning ON the trigger input).
- Switch the write data input (ID0 to ID15) at least 10 ms before accessing the RF Tag (e.g., at least 10 ms before turning ON the trigger input).

Auto Mode1: Read



Access Address : 0010 hex
Output Mode : 10 ms OFF delay



A. Preparations — Before starting communications with the RF Tag, turn OFF the R/W input and set the address shift input bits (ADR0 to ADR2).

B. Canceling communications prohibition — Turn OFF the INHIBIT/TRIG before starting communications.

▪ Normal Completion of Communications with RF Tag

C. Start of communications — The ID Flag Sensor will start communications with the RF Tag when the RF Tag enters the communications area of the Antenna.

D. End of communications — If communications with the RF Tag are completed normally, the ID Flag Sensor will turn ON the NORMAL/STRB output and will store the read data in the data output bits (OD0 to OD15). The Data Display LED (0 to 15) corresponding to the read data will be lit green.

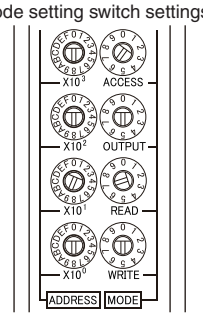
E. Clearing results — After the RF Tag is out of the communications area of the Antenna, the NORMAL/STRB output and data output bits (OD0 to OD15) will be turned OFF after the time set for the OFF delay in the output mode time setting has elapsed.
The NORMAL/STRB output, the data output bits (OD0 to OD15) and the Data Display LED can be unconditionally cleared by turning ON the INHIBIT/TRIG input.

CHECK!

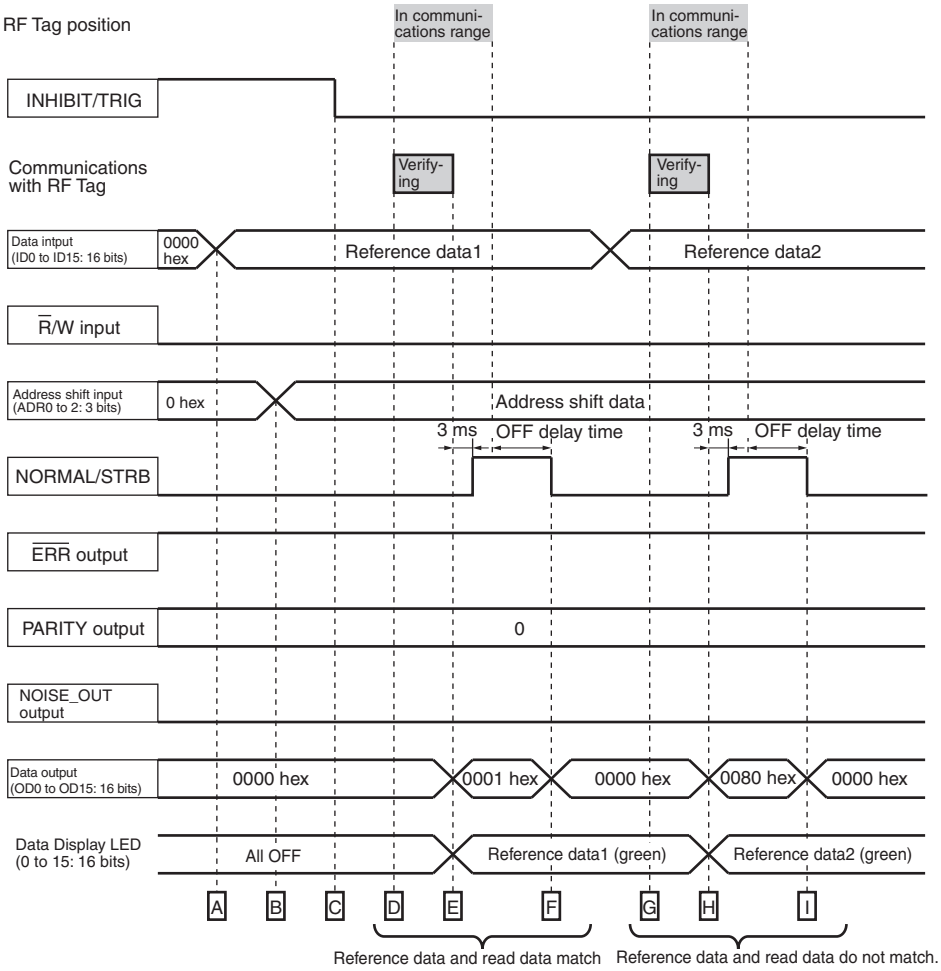
- At least 10 ms is required for enabling INHIBIT/TRIG input as operation prohibit or clear the data.
- Wait at least 10 ms after switching the R/W input line before performing next process.
- Switch the address shift input (ADR0 to ADR2) at least 10 ms before accessing the RF Tag (e.g., at least 10 ms before turning ON the trigger input).
- Read the data output (OD0 to OD15) after the NORMAL/STRB output turns ON.]
- In Auto Mode, the ID Flag Sensor does not output the error in case when the ID Flag Sensor can not complete the communication process caused by passing the RF Tag quickly in the communications area of the Antenna before completing the communication or interfering by electrical noise. Be sure to check the communications carefully when installing the system.
- Error in Auto Mode will occur when the input to the ID Flag Sensor has errors such as the external input error or address setting error at the time to start the communications with the RF Tag. In this case, the ID Flag Sensor will turns ON"0" the ERR output and will store the error code in the data output bits (OD0 to OD15) in Normal Read Mode, or will store FFFF hex(ON all bits) in Read Mode with Wire-saving mode. The Data Display LED(0 to 15) corresponding to the error code will be lit red.

Auto Mode1: VERIFY

Mode setting switch settings



Access Address : 0010 hex
Output Mode : 10 ms OFF delay



A, B. Preparations — Before starting communications with the RF Tag, turn OFF the R/W input, set the reference data on the data input bits (ID0 to ID15), and set the address shift input bits (ADR0 to ADR2).

C. Canceling communications prohibition — Turn OFF the INHIBIT/TRIG before starting communications.

▪ Reference Data and Read Data Match

D. Start of communications — The ID Flag Sensor will start communications with the RF Tag when the RF Tag enters the communications area of the Antenna.

E. End of communications — If communications with the RF Tag are completed normally, the ID Flag Sensor will turn ON the NORMAL/STRB output and the data output bit (OD0: data match). The VERIFY OK/NG indicator will be lit green, and the data indicators (0 to 15) corresponding to the reference data will be lit green.

F. Clearing results — After the RF Tag is out of the communications area of the Antenna, the NORMAL/STRB output and data output bits (OD0 to OD15) will be turned OFF after the time set for the OFF delay in the output mode time setting has elapsed. The NORMAL/STRB output , the data output bits (OD0 to OD15) and the Data Display LED can be unconditionally cleared by turning ON the INHIBIT/TRIG input.

▪ Reference Data and Read Data Mismatch

G. Start of communications — The ID Flag Sensor will start communications with the RF Tag when the RF Tag enters the communications area of the Antenna.

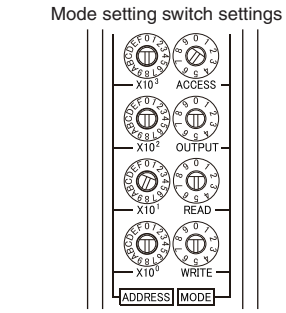
H. End of communications — If communications with the RF Tag are completed normally, the ID Flag Sensor will turn ON the NORMAL/STRB output and the data output bit (OD7: data mismatch). The VERIFY OK/NG indicator will be lit red, and the data indicators (0 to 15) corresponding to the reference data will be lit green.

I. Clearing results — After the RF Tag is out of the communications area of the Antenna, the NORMAL/STRB output and data output bits (OD0 to OD15) will be turned OFF after the time set for the OFF delay in the output mode time setting has elapsed. The NORMAL/STRB output, the data output bits (OD0 to OD15) and the Data Display LED can be unconditionally cleared by turning ON the INHIBIT/TRIG input.

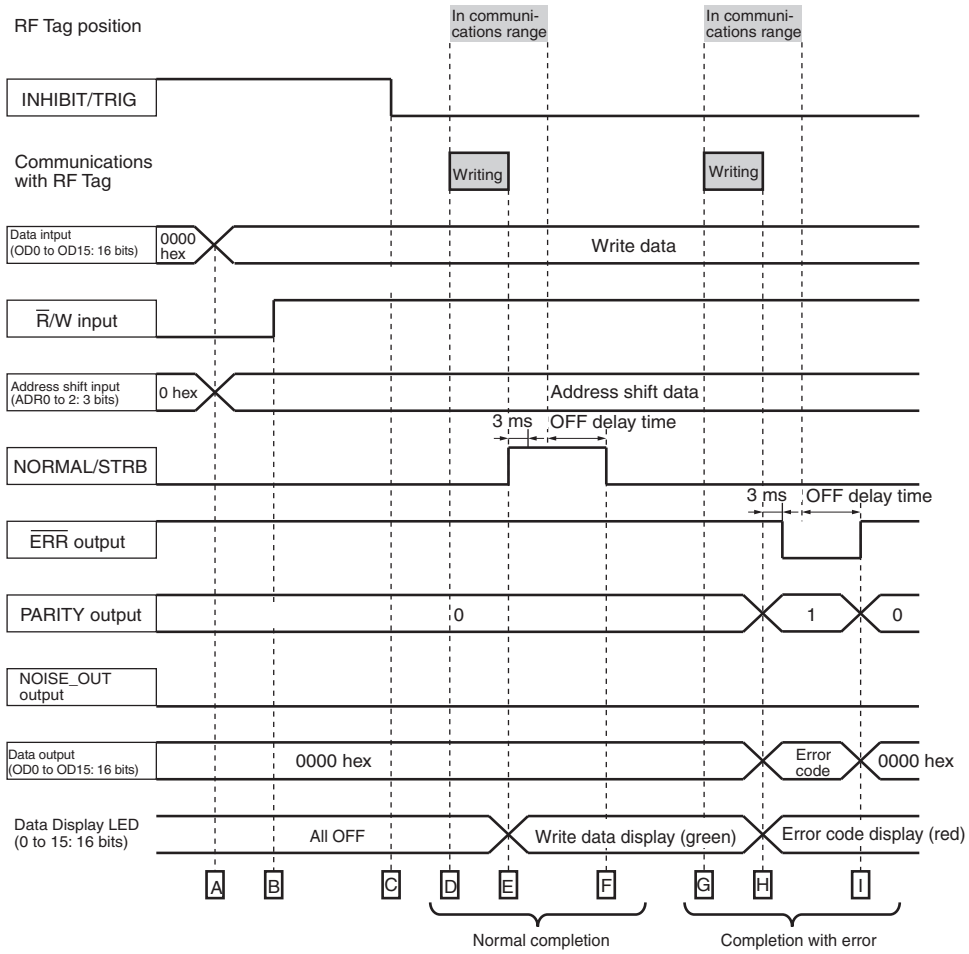
CHECK!

- At least 10 ms is required for enabling INHIBIT/TRIG input as operation prohibit or clear the data.
- Wait at least 10 ms after switching the R/W input line before performing next process.
- Switch the address shift input (ADR0 to ADR2) at least 10 ms before accessing the RF Tag.
- Switch the reference data input (ID0 to ID15) at least 10 ms before accessing the RF Tag.
- Read the data output (OD0 to OD15) after the NORMAL/STRB output turns ON.
- In Auto Mode, the ID Flag Sensor does not output the error in case when the ID Flag Sensor can not complete the communication process caused by passing the RF Tag quickly in the communications area of the Antenna before completing the communication or interfering by electrical noise. Be sure to check the communications carefully when installing the system.

Auto Mode1: Write



Access Address : 0010 hex
Output Mode : 10 ms OFF delay



A, B. Preparations	Turn ON the R/W input before starting communications with the RF Tag, set the write data on the data input bits (ID0 to ID15), and set the address shift input bits (ADR0 to ADR2).
C. Canceling communications prohibition	Turn OFF the INHIBIT/TRIG before starting communications.

▪ Normal Completion of Communications with RF Tag

D. Start of communications	The ID Flag Sensor will start communications with the RF Tag when the RF Tag enters the communications area of the Antenna.
E. End of communications	If communications with the RF Tag are completed normally, the ID Flag Sensor will turn ON the NORMAL/STRB output. The Data Display LED (0 to 15) corresponding to the write data will be lit green.
F. Clearing results	After the RF Tag is out of the communications area of the Antenna, the NORMAL/STRB output and data output bits (OD0 to OD15) will be turned OFF after the time set for the OFF delay in the output mode time setting has elapsed. The NORMAL/STRB output, the data output bits (OD0 to OD15) and the Data Display LED can be unconditionally cleared by turning ON the INHIBIT/TRIG input.

▪ Error Completion of Communications with RF Tag

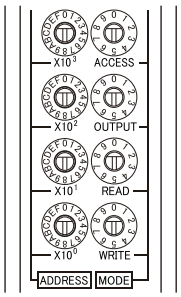
G. Start of communications	The ID Flag Sensor will start communications with the RF Tag when the RF Tag enters the communications area of the Antenna.
H. End of communications	If communications with the RF Tag are completed with an error (Write Verify error, Lock error, Write-protect error etc.), the ID Flag Sensor will turn ON "0" the ERR output and will store the error data in the data output bits (OD0 to OD15). The Data Display LED (0 to 15) corresponding to the error data will be lit red.
I. Clearing results	After the RF Tag is out of the communications area of the Antenna, the ERR output will turns OFF"1" and data output bits (OD0 to OD15) will be turned OFF after the time set for the OFF delay in the output mode time setting has elapsed. The NORMAL/STRB output, the data output bits (OD0 to OD15) and the Data Display LED can be unconditionally cleared by turning ON the INHIBIT/TRIG input.

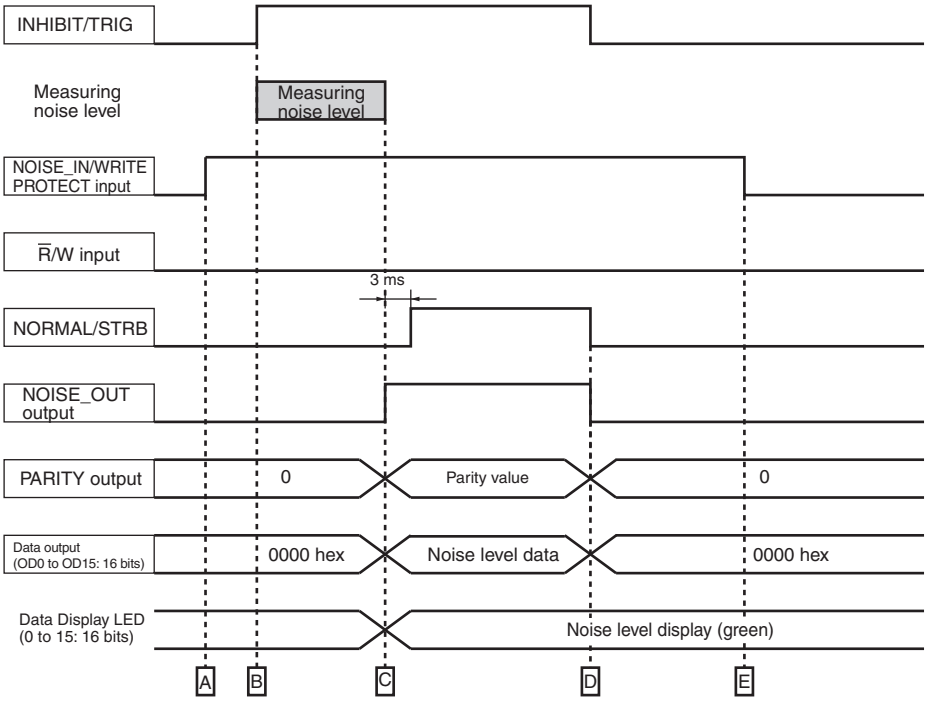
CHECK!

- At least 10 ms is required for enabling INHIBIT/TRIG input as operation prohibit or clear the data.
- Wait at least 10 ms after switching the R/W input line before performing next process.
- Switch the address shift input (ADR0 to ADR2) at least 10 ms before accessing the RF Tag.
- Switch the write data input (ID0 to ID15) at least 10 ms before accessing the RF Tag.
- In Auto Mode, the ID Flag Sensor does not output the error in case when the ID Flag Sensor can not complete the communication process caused by passing the RF Tag quickly in the communications area of the Antenna before completing the communication or interfering by electrical noise. Be sure to check the communications carefully when installing the system.

Trigger Mode1 :Noise Measurement

Mode setting switch settings





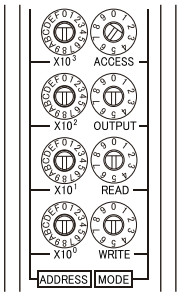
A. Preparations	Turn OFF the R/W input and INHIBIT/TRIG input, and turn ON the NOISE_IN/WRITE PROTECT input.
B. Start of measurement	Turn ON the INHIBIT/TRIG input to start noise measurement.
C. End of measurement	When the noise level measurement is completed, the ID Flag Sensor will turn ON the NORMAL/STRB output, store the noise level data in the output data bits (OD0 to OD15), and store the parity value in the PARITY output.
D. Clearing results	When you turn OFF the INHIBIT/TRIG input, the NORMAL/STRB output will be turned OFF, the parity value(0) will be set on the PARITY output, and the data output bits (OD0 to OD15) will be cleared to 0000 hex.
E. Return to communications	Turn OFF the INHIBIT/TRIG input and NOISE_IN/WRITE PROTECT input to return to read and write communication mode.

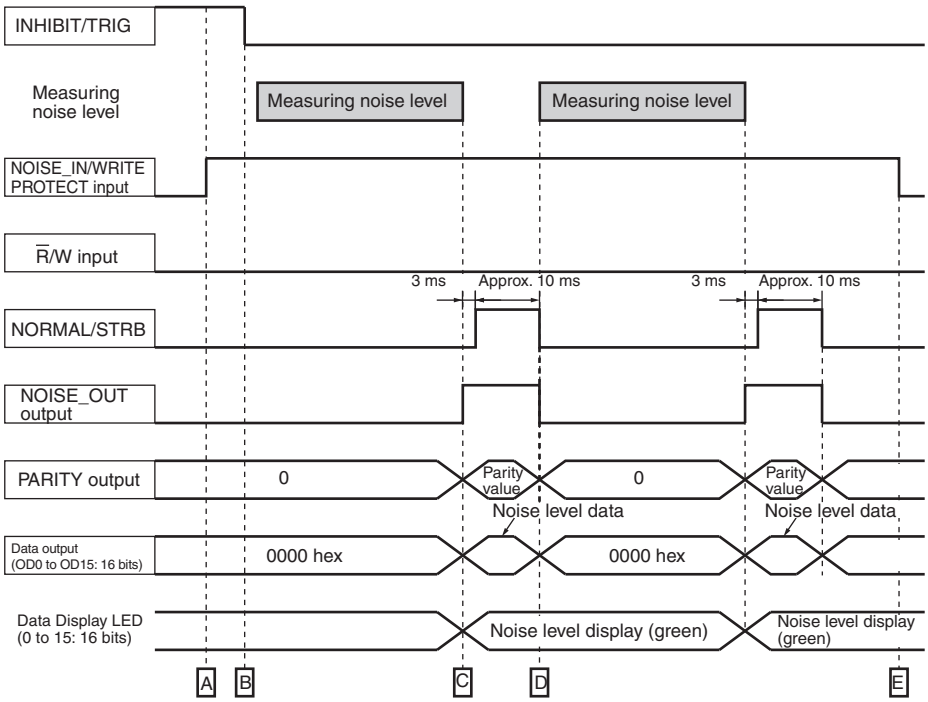
CHECK!

- At least 10 ms the INHIBIT/TRIG input duration is required for measuring the noise level.
- Read the noise level data output (OD0 to OD15) after the NORMAL/STRB output turns ON.

Auto Mode1 (Noise Measurement)

Mode setting switch settings





A. Preparations	Turn OFF the R/W input , and turn ON the INHIBIT/TRIG input and the NOISE_IN/WRITE PROTECT input.
B. Start of measurement	Turn OFF the INHIBIT/TRIG input to start noise measurement.
C. End of measurement	When the noise level measurement is completed, the ID Flag Sensor will turn ON the NORMAL/STRB output, store the noise level data in the output data bits (OD0 to OD15), and store the parity value in the PARITY output.
D. Clearing results	About 10msec has elapsed after output NORMAL/STRB output, the NORMAL/STRB output will be turned OFF, the parity value(0) will be set on the PARITY output, and the data output bits (OD0 to OD15) will be cleared to 0000 hex. And then, start noise measurement repeatedly.
E. Return to communications	Turn OFF the INHIBIT/TRIG input and NOISE_IN/WRITE PROTECT input to return to read and write communication mode.

CHECK!

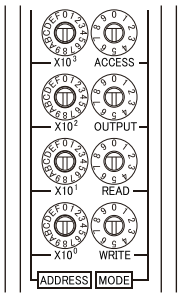
- At least 10 ms the INHIBIT/TRIG input duration is required for measuring the noise level.
- Read the noise level data outpu (OD0 to OD15) after the NORMAL/STRB output turns ON.

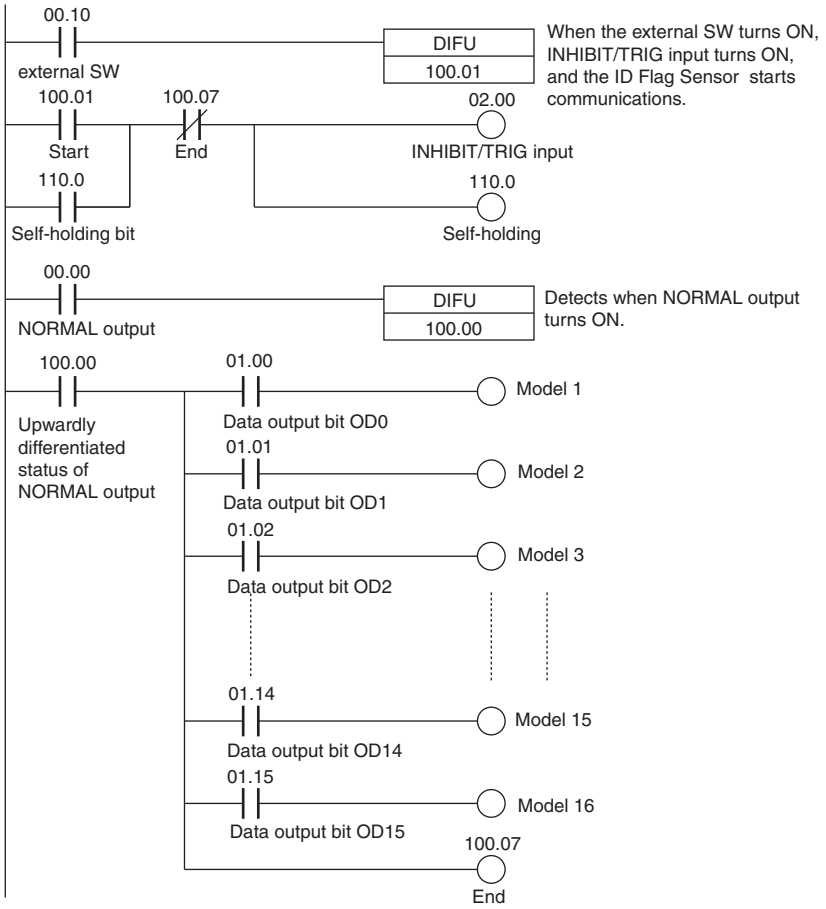
Sample Programming

Reading Flags

This sample program shows a programming example for using an external switch with a Sensor or other device to read RF Tag data and turn ON the outputs for bits allocated to various devices.

Mode setting switch settings

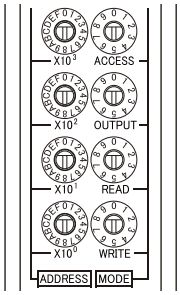


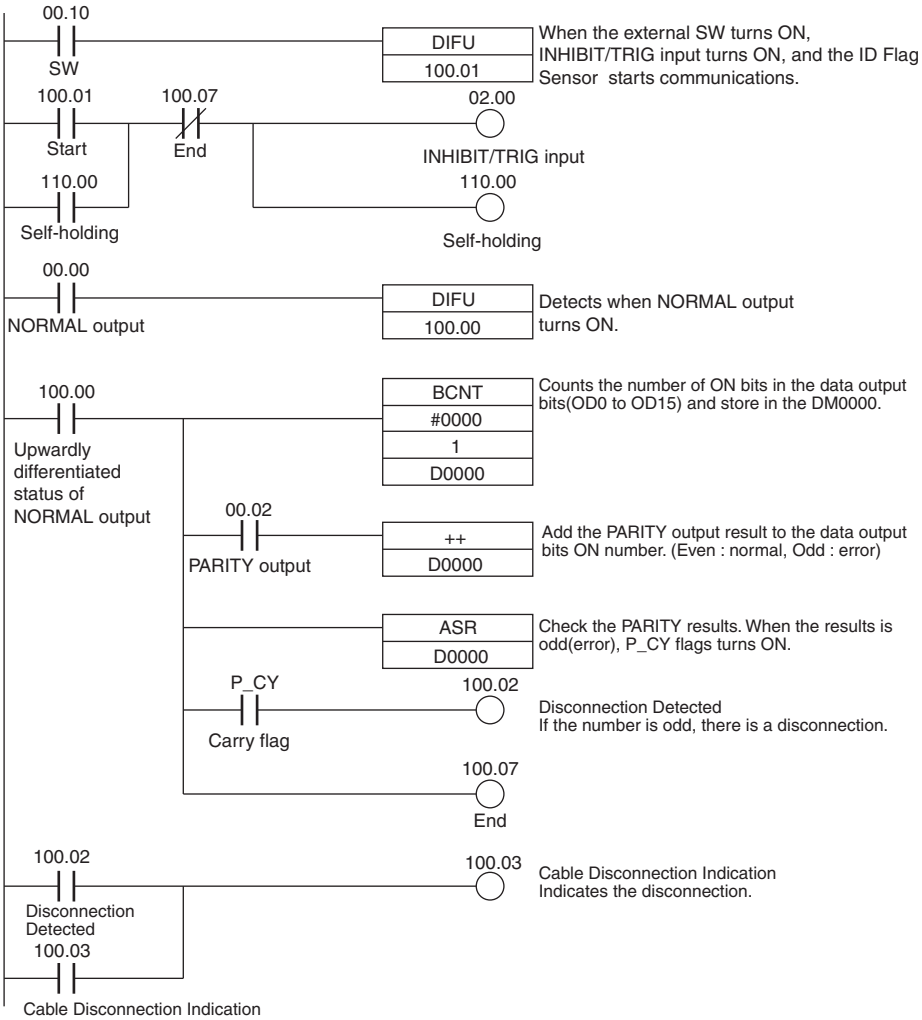


Detecting Disconnection

This sample program shows a programming example for detecting disconnection of data output lines (16 lines) by using the parity output.

Mode setting switch settings

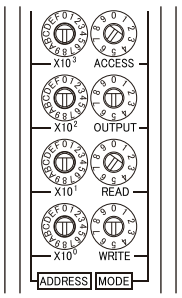


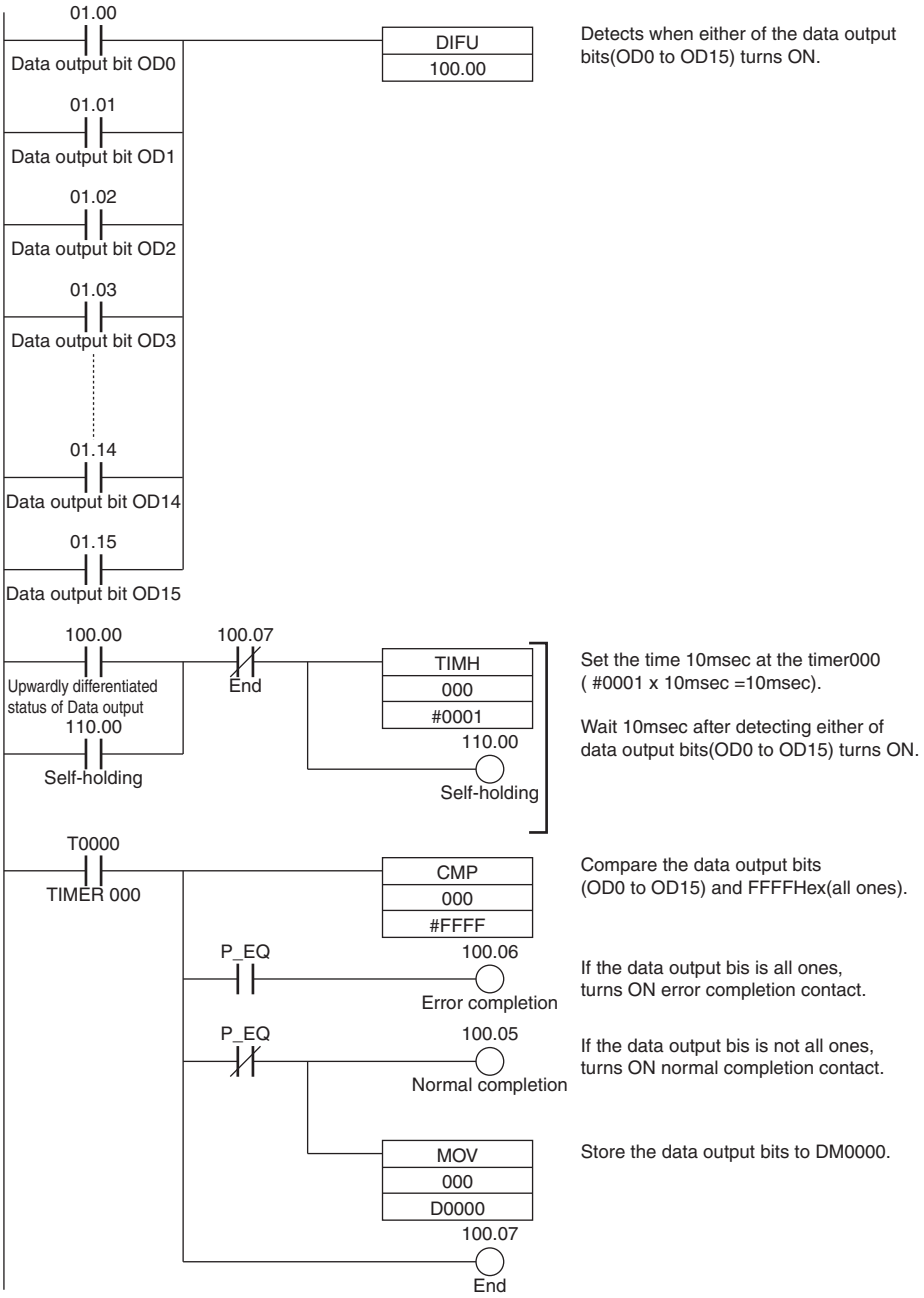


Auto Mode with Wire-saving Mode

This sample program shows a programming example for reading the RF Tag in Auto Mode with Wire-saving mode. The ID Flag Sensor read the RF Tag data in Auto Mode with Wire-saving mode , store the read data in the DM0000, and outputs normal completion contact(100.05). If the communications is completed with error, error completion contact(100.06) turns ON.

Mode setting switch settings





MEMO

Section 6
Troubleshooting

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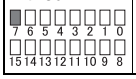
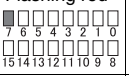
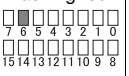
Handling Errors

Check the error status by looking at the 16bits Data Display LED and the Error output($\overline{\text{ERR}}$)/Data Output(OD0 to OD15), and then take suitable actions.

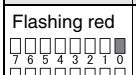
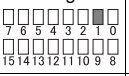
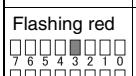
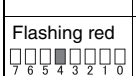
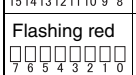
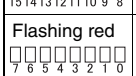
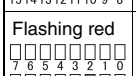
Hardware Errors

	Data Output	Error	Corrective action
Lit red 	No output	Hardware error	If the error continues after resetting the power, replace the ID Flag Sensor.

Operation Errors

	Data Output	Error	Corrective action
Flashing red 	No output	Settings error	Set the Access address setting switches or Mode setting switches within the correct range.
Flashing red 	OD6	External Input error	There are possibilities that external noise is applied or chattering or delay at the Input lines. Follow the instruction in the Chapter 4 *Installation, Connections, and Wiring* and *Errors and Countermeasures* of this chapter.

RFID-related Errors

	Data Output	Error	Corrective action
Flashing red 	OD0	RF Tag communication error : RF Tag was detected in TRIGGER MODE but communications could not be ended normally.	Change the control timing so that communications can be started while the RF Tag is within the Antenna's communications range. Measure the noise and take suitable noise countermeasures. Check the effect of surrounding metal and make sure that the desired communications distance can be obtained.
Flashing red 	OD1	Verify error : Data was not correctly written to RF Tag .	Retry the writing process. If the error persists, replace the RF Tag.
Flashing red	OD2	No RF Tag error : An RF Tag could not be detected in TRIGGER MODE.	Change the control timing so that communications can be started while the RF Tag is within the Antenna's communications range. Measure the noise and take suitable noise countermeasures. Check the effect of surrounding metal and make sure that the desired communications distance can be obtained.
Flashing red 	OD3	Address setting error : The access address setting switches set to a memory area outside the RF Tag memory range.	Set the Access address setting switches within the RF Tag memory range.
Flashing red 	OD4	Write protect error : Write operation executed to the write-protected area of RF Tag.	Execute the write operation to outside the write-protected area. Disabled Write protect function, if you do not use write protect function.
Flashing red 	OD8	RF Tag error 1 : RF Tag used is not supported by the ID Flag Sensor.	Change the RF Tag to one supported by the ID Flag Sensor.
Flashing red 	OD9	RF Tag error 2 : RF Tag used is not supported by the ID Flag Sensor.	
Flashing red 	OD10	RF Tag error 3 : RF Tag used is not supported by the ID Flag Sensor.	
Flashing red	OD5	Hardware Data error : Data in the specified address is set to all 0s or 1s in the DATA READ 2 MODE.	Change the RF Tag data in the specified address except for all 0s or 1s.

Note. Flashing is turing on and off every 0.3sec.

Errors and Countermeasures

The four main causes of problems that may occur in the ID Flag Sensor are as follows:

- Noise interference · · · · · · · · · · · · · · Take adequate countermeasures against noise.
- External device failure
- ID Flag Sensor failure
- Others

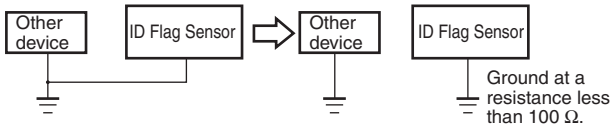
} · · · · · · · Repairs are required.

■ Noise Interference

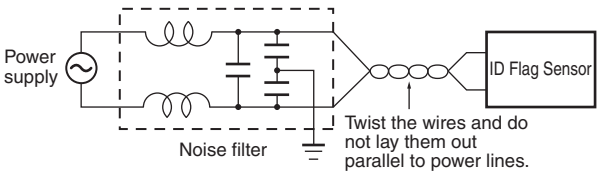
If the system malfunctions due to noise, refer to the following table and take appropriate countermeasures.

No.	Occurrence of fault	Possible cause	Countermeasure
1	Occurs when a heavy-duty motor, transformer, or capacitor is turned ON.	An instantaneous voltage drop due to inrush current to the heavy load.	Increase the capacity of the power supply and the size of the power cable.
		Common mode noise as a result of the above cause.	• Provide the power through a 1-to-1 non-grounded insulating transformer. • Do not use the same ground as other large-capacity devices. Independently ground the Controller at a resistance of 100 Ω or less. (See figure1.)
2	Occurs irregularly.	Noise on power line	Provide the power through a 1-to-1 non-grounded insulating transformer or noise filter. (See figure 2.)
3	Malfunction such as input signal turning ON when it should be OFF.	Inductive noise on input line	• Separate input signal from power lines. • If there is a lot of noise interference, put the input line inside a grounded metal conduit or use shielded cable.

1. Improvement in Grounding



2. Countermeasures Against Noise on Power Line



Maintenance and Inspection

The ID Flag Sensor must be inspected on a daily or regular basis so that the functions can be used in good condition. The ID Flag Sensor consists of semiconductors that last almost indefinitely. The following malfunctions may, however, result due to the operating environment and conditions.

(1) Element deterioration due to overvoltage or overcurrent.

(2) Element deterioration due to continuous stress caused by high ambient temperature.

(3) Connector contact faults or insulation deterioration due to humidity and dust.

(4) Connector contact faults or element corrosion due to corrosive gas.

■ Inspection Items

No.	Item	Detail	Criteria	Required equipment
1	Supply voltage fluctuation	(1) Check that the supply voltage fluctuation at the power supply terminal block is within the permissible range.	Within supply voltage specified range	Multimeter
		(2) Check that there are no frequent instantaneous power failures or radical voltage fluctuations.	Within permissible voltage fluctuation range	Power supply analyzer
2	Ambient environment (a) Temperature (b) Humidity (c) Vibration and shock (d) Dust (e) Corrosive gas	 (a) Within the specified range (b) Within the specified range (c) Influence of vibration or impact of machines (d) Check that the system is free of accumulated dust and foreign particles. (e) Check that no metal part of the system is discolored or corroded.	 (a) −10 to 55°C (b) 25% to 85% (c) Within the specified range (d) Neither is permitted. (e) Neither is permitted.	Maximum and minimum thermometer Hygrometer
3	Panel condition (a) Ventilation (b) Damage to packing for any enclosed construction	 (a) Check that the system is ventilated properly with natural ventilation, forced ventilation, or cooling air. (b) Check that the panel packing is properly attached with no damage.	 (a) The interior temperature must be within a range between −10 and 55°C with proper ventilation. (b) The packing must have no damage.	---
4	I/O power supply (a) Voltage fluctuation (b) Ripple	Check on the I/O terminal block that the voltage fluctuation and ripple are within the permissible ranges.	Within the specified range	Multimeter Oscilloscope
5	Mounting condition	(1) Check that each device is securely mounted.	No loose screws	---
		(2) Check that each connector is fully inserted.	Each connector must be locked or securely tightened with screws.	---
		(3) Check that no wire is broken or nearly broken.	Must be no wire that is broken or nearly broken.	---
		(4) Check that the distance between the RF Tag and Antenna is within the specified range.	Within the specified range	---
6	RF Tag life	Manage the number of times the RF Tag has been written	Do not allow the specified maximum number of overwrites to be exceeded.	---

Section 7
Appendices

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Product Specifications

ID Flag Sensor

■ General Specifications

V680-HAM91/-HAM81

Item Model	V680-HAM91/V680-HAM81
Supply voltage	24 VDC +10%/-15%, Ripple (p-p): 10% max.
Power consumption	3.5 W max. (supply voltage: 24 VDC, current consumption: 0.15A Max., not included I/O Interface current.)
Ambient operating temperature	-10 to 55°C (with no icing)
Ambient storage temperature	-25 to 65°C (with no icing)
Ambient operating humidity	25% to 85% (with no condensation)
Insulation resistance	20 MΩ min. (at 500 VDC) between terminals(except for FG) and casing
Dielectric strength	1,000 VAC, 50/60Hz for 1 min between terminals(except for FG) and casing
Vibration resistance	10 to 150 Hz, 0.2-mm double amplitude, acceleration: 15m/s², 10 sweeps in each 3 directions (up/down, left/right, and forward/backward) for 8 minutes each
Shock resistance	150 m/s², 3 times each in 6 directions (Total: 18 times)
Dimensions	90 × 30 × 65 mm (excluding protruding parts)
Degree of protection	IP40 (IEC60529)
Material	PC + ABS
Weight	Approx. 130 g
Mounting method	DIN Track

▪ Interface cable

V680-A60 2M/5M/10M

Specifications	cable length	model
Interface cable (Connector : 26pins)	2m	V680-A60 2m
	5m	V680-A60 5m
	10m	V680-A60 10m

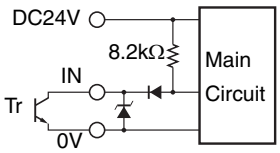
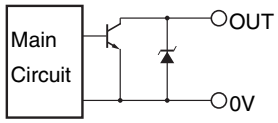
The interface cable connector is not waterproof.
The maximum cable length is 10 m.

■ I/O Specifications

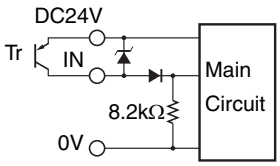
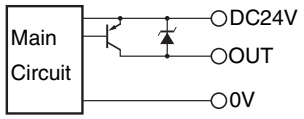
Item	V680-HAM91	V680-HAM81
Input	Transistor output or contact output Short-circuit current: 3 mA (typical) (Input terminal and 0-V short-circuit) OFF voltage: 15 to 30 VDC ON voltage: 0 to 5 VDC Input impedance: 8.2 kΩ Applied voltage: 30 VDC max.	
Output	NPN open collector, 20 mA max. at 30 VDC, residual voltage: 2 V max.	PNP open collector, 20 mA max. at 30 VDC, residual voltage: 2 V max.

▪ I/O Circuit Diagram

V680-HAM91

Input Circuit	Output Circuit
	

V680-HAM81

Input Circuit	Output Circuit
	

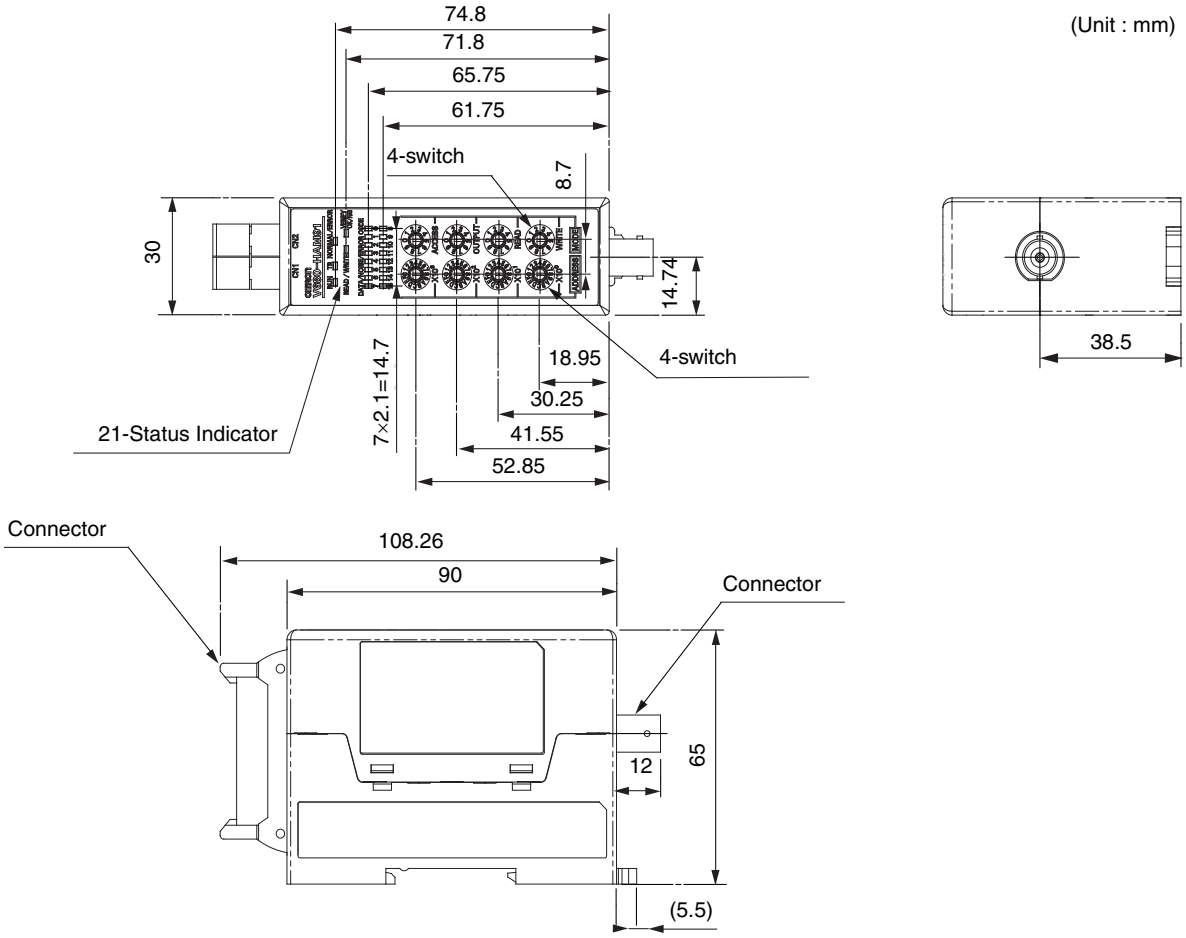
CHECK!

INPUT/OUTPUT controls

- When using a solid-state output with the maximum switching current rating over 1A , there is a possibility of causing External Input Errors due to the delay of rise /fall time of output signal. Consider this when selecting the solid-state output.
- When using a contact output, consider chattering and the minimum switching current.
- When connecting an inductive load or an electrical device that tends to generate noise to the output, connect a diode in parallel with the load. Connect the cathode side of the diode to the positive side of the power supply.

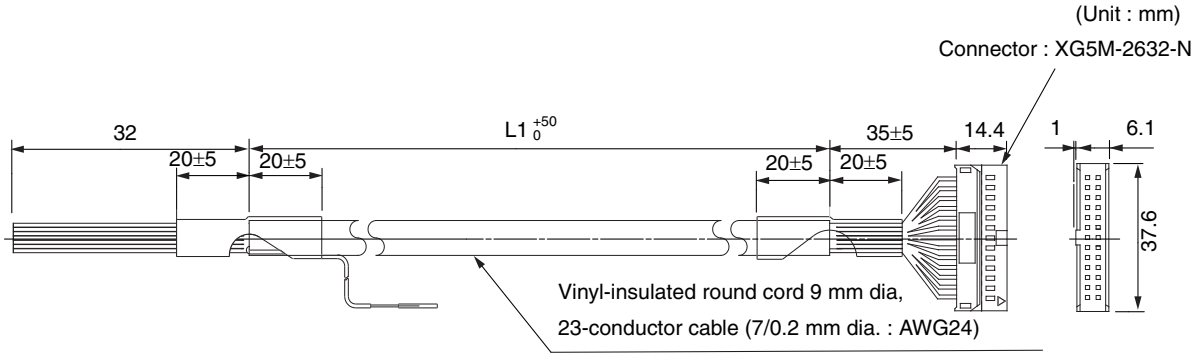
■ Dimensions

V680-HAM91/-HAM81



▪ Interface cable

V680-A60 2M/5M/10M



The interface cable connector is not waterproof.

The maximum cable length is 10 m.

Model	L1 Length (mm)
V680-A60 2M	2000
V680-A60 5M	5000
V680-A60 10M	10000

Antenna

Four models of Antennas can be used with ID Slave. Select the best Antenna for the application.

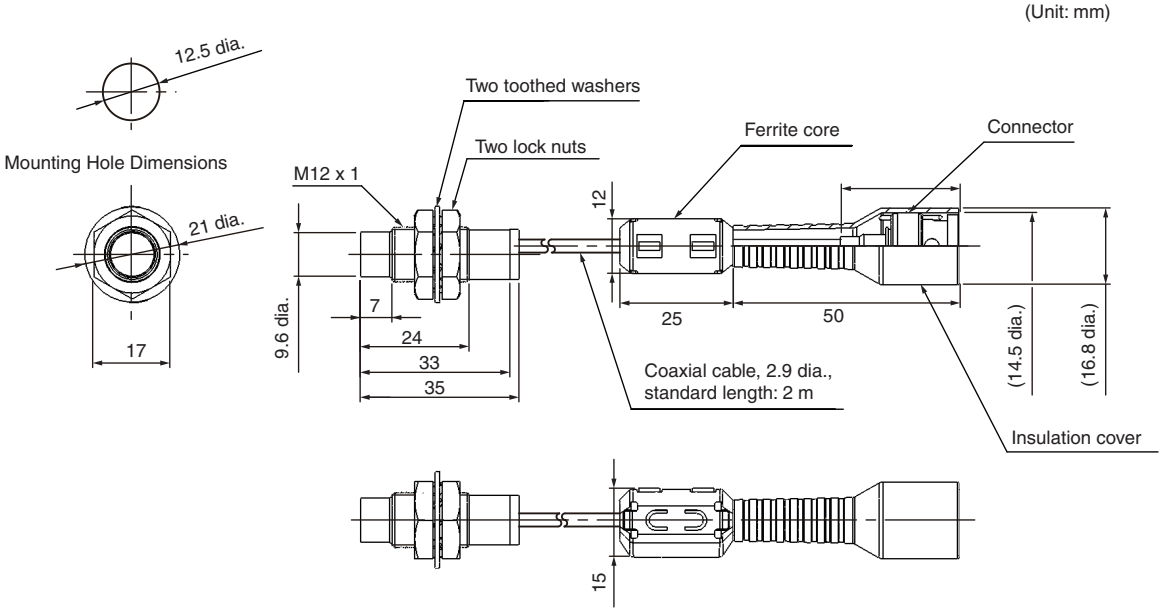
■ V680-HS51

▪ General Specifications

Item / Model	V680-HS51
Ambient operating temperature	−10 to 60°C (with no icing)
Ambient storage temperature	−25 to 75°C (with no icing)
Ambient operating humidity	35% to 95% (with no condensation)
Insulation resistance	20 MΩ min. (at 500 VDC) between cable terminals and case
Dielectric strength	1,000 VAC, 50/60Hz for 1 min between cable terminals and case
Degree of protection	IP67 (IEC 60529) Oil resistance equivalent to IP67g according to the former JEM standard. (Read/Write Antenna portion) Note: The Connector is not waterproof.
Vibration resistance	10 to 2,000 Hz, 1.5-mm double amplitude, acceleration: 150 m/s², 10 sweeps in each of 3 directions (up/down, left/right, and forward/backward) for 15 minutes each
Shock resistance	1,000 m/s², 3 times each in 6 directions (Total: 18 times)
Dimensions	M12 × 35 mm
Material	ABS, brass, and epoxy resin filling
Weight	Approx. 55 g
Cable length	Standard length of 2 m

■ Dimensions

(Unit: mm)



Case material	Brass
Communications surface	ABS resin
Filling resin	Epoxy resin
Cable	PVC (black)

■ V680-HS52-W/R

▪ General Specifications

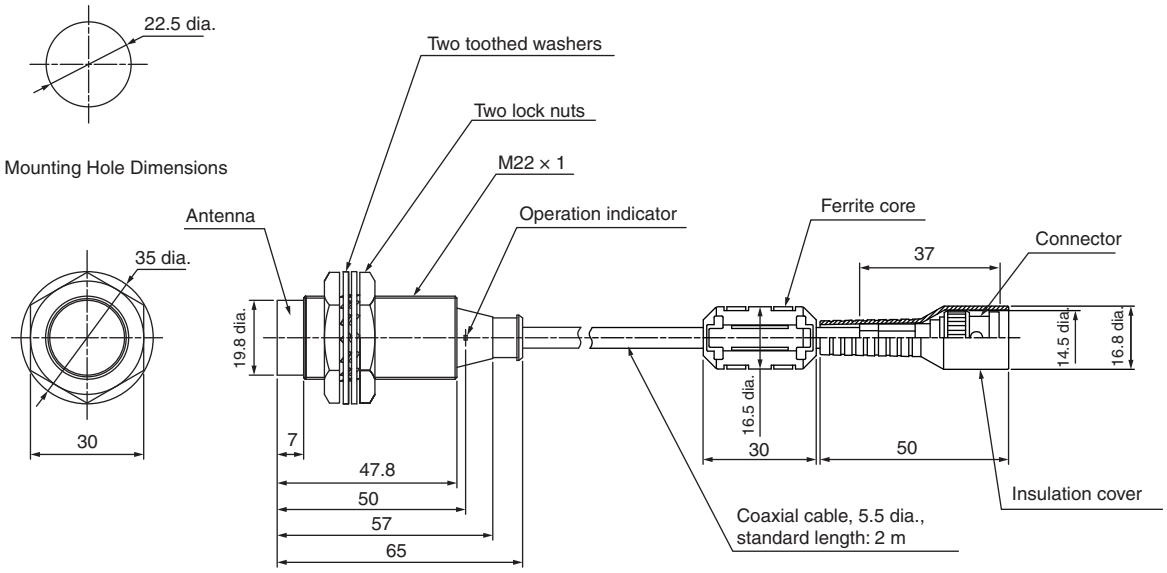
Item / Model	V680-HS52-W (Standard cable, waterproof connector)	V680-HS52-R (Flexible cable, non-waterproof connector)
Ambient operating temperature	−10 to 60°C (with no icing)	
Ambient storage temperature	−25 to 75°C (with no icing)	
Ambient operating humidity	35% to 95% (with no condensation)	
Insulation resistance	20 MΩ min. (at 500 VDC) between cable terminals and the case	
Dielectric strength	1,000 VAC, 50/60 Hz for 1 min between cable terminals and case	
Degree of protection	IP67 (IEC 60529) Oil resistance equivalent to IP67g according to the former JEM standard. Note: The connector specifications are IP67 and IP65 (IEC 60529). (See Note.)	IP67 (IEC 60529) Oil resistance equivalent to IP67g according to the former JEM standard. Note: The connectors are not waterproof.
Vibration resistance	10 to 500 Hz, 1.5-mm double amplitude, acceleration: 100 m/s², 1 sweep in each 3 directions (up/down, left/right, and forward/backward) for 8 minutes each	
Shock resistance	500 m/s², 3 times each in 6 directions (Total: 18 times)	
Dimensions	M22 × 65 mm	
Material	ABS resin, brass, and epoxy resin filler	
Weight	Approx. 850 g (with 12.5-m cable)	
Cable length	Standard lengths of 2 and 12.5 m	

Note : The ID Flag Sensor is not waterproof. Do not use it in an environment where mist is present.

▪ Dimensions

V680-HS52-W

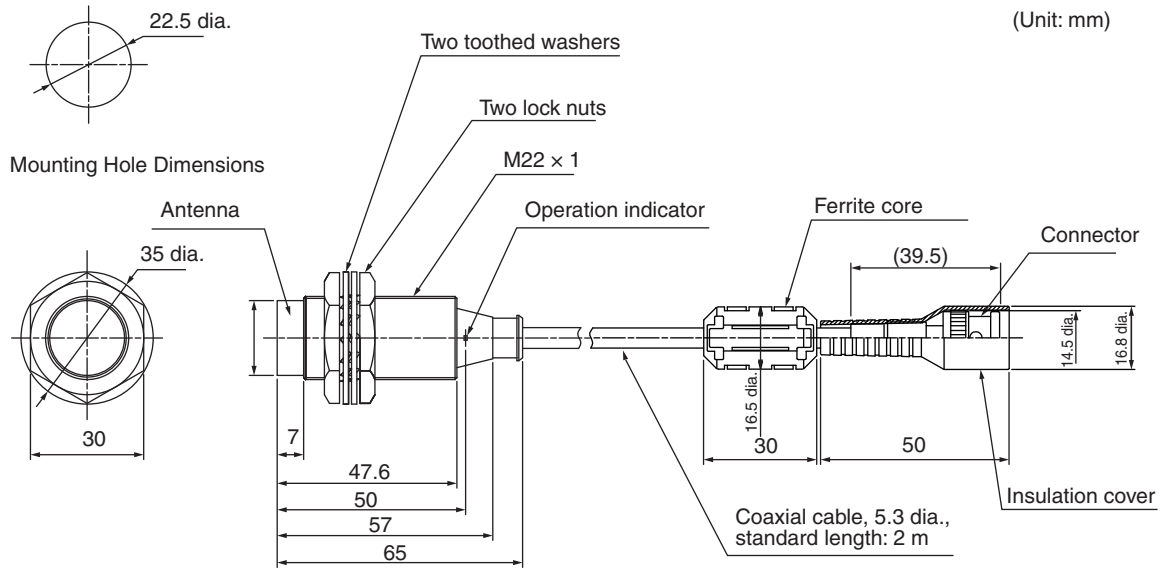
(Unit: mm)



Case material	Brass
Communications surface	ABS resin
Filling resin	Epoxy resin
Cable	PVC (gray)

V680-HS52-R

(Unit: mm)



Case material	Brass
Communications surface	ABS resin
Filling resin	Epoxy resin
Cable	PVC (black)

■ V680-HS63-W/R

▪ General Specifications

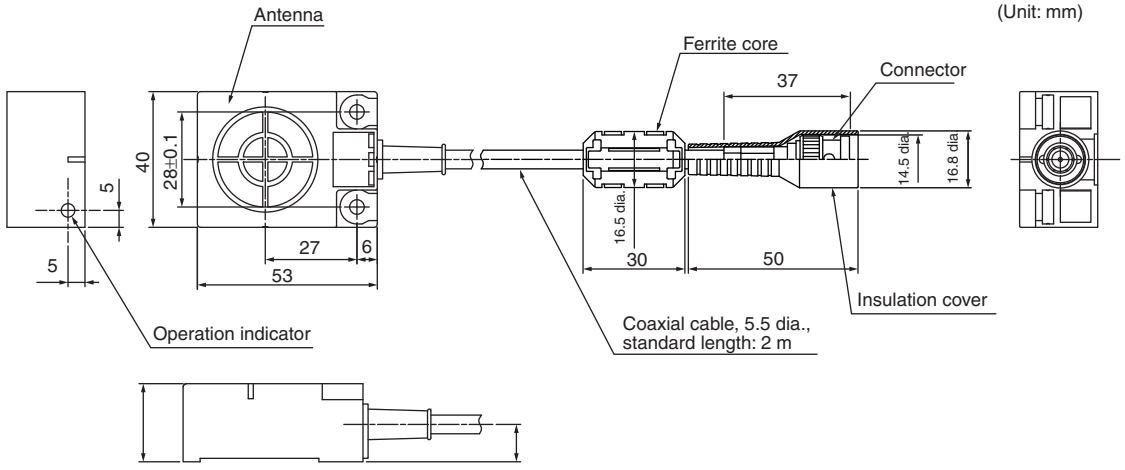
Item / Model	V680-HS63-W (Standard cable, waterproof connector)	V680-HS63-R (Flexible cable, non-waterproof connector)
Ambient operating temperature	−10 to 60°C (with no icing)	
Ambient storage temperature	−25 to 75°C (with no icing)	
Ambient operating humidity	35% to 95% (with no condensation)	
Insulation resistance	20 MΩ min. (at 500 VDC) between cable terminals and case	
Dielectric strength	1,000 VAC, 50/60 Hz for 1 min between cable terminals and case	
Degree of protection	IP67 (IEC 60529) Oil resistance equivalent to IP67g according to the former JEM standard. Note: The connector specifications are IP67 and IP65 (IEC 60529). (See Note.)	IP67 (IEC 60529) Oil resistance equivalent to IP67g according to the former JEM standard. Note: The connectors are not waterproof.
Vibration resistance	10 to 500 Hz, 1.5-mm double amplitude, acceleration: 100 m/s², 10 sweeps in each of 3 directions up/down, left/right, and forward/backward) for 11 minutes each	
Shock resistance	500 m/s², 3 times each in 6 directions (Total: 18 times)	
Dimensions	40 × 53 × 23 mm	
Material	ABS resin case, epoxy resin filler	
Weight	Approx. 850 g (with 12.5-m cable)	
Cable length	Standard lengths of 2 and 12.5 m	

Note : The ID Flag Sensor is not waterproof. Do not use it in an environment where mist is present.

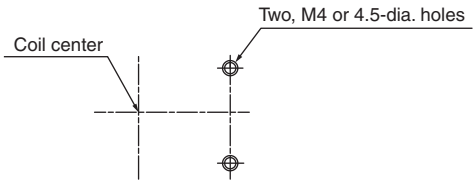
▪ Dimensions

V680-HS63-W

(Unit: mm)



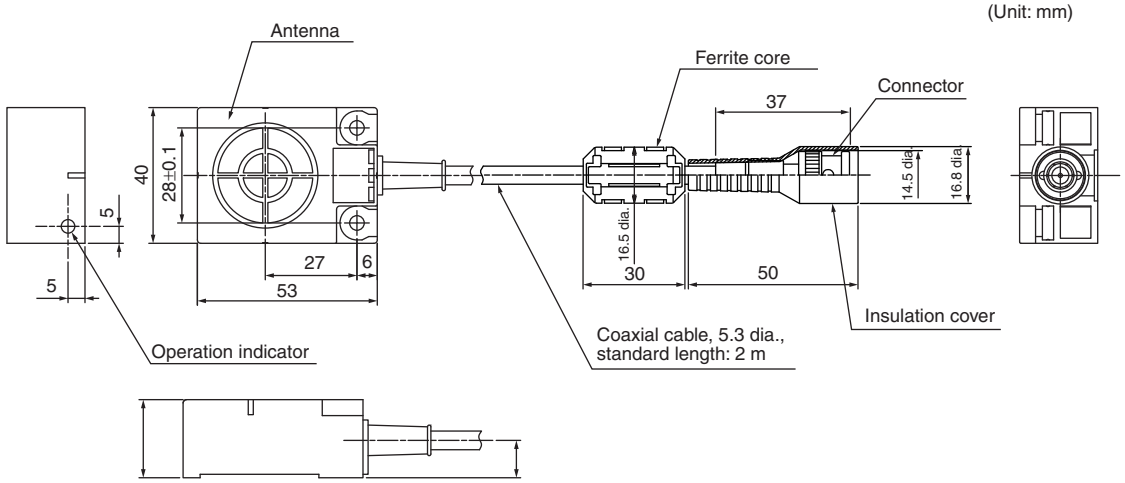
Note: Mounting Hole Dimensions



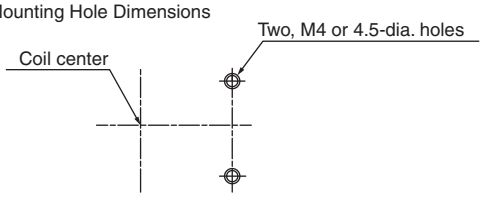
Case material	ABS resin
Filling resin	Epoxy resin
Cable	PVC (gray)

V680-HS63-R

(Unit: mm)



Note: Mounting Hole Dimensions



Case material	ABS resin
Filling resin	Epoxy resin
Cable	PVC (black)

■ V680-HS65-W/R

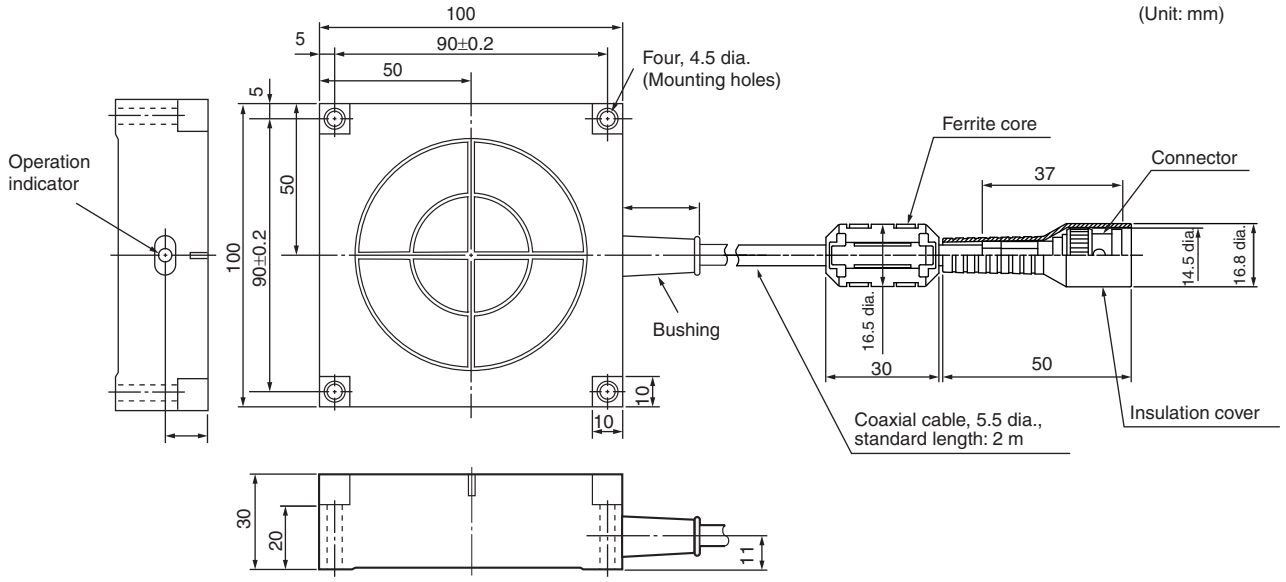
▪ General Specifications

Item / Model	V680-HS65-W (Standard cable, waterproof connector)	V680-HS65-R (Flexible cable, non-waterproof connector)
Ambient operating temperature	−25 to 70°C (with no icing)	
Ambient storage temperature	−40 to 85°C (with no icing)	
Ambient operating humidity	35% to 95% (with no condensation)	
Insulation resistance	20 MΩ min. (at 500 VDC) between cable terminals and case	
Dielectric strength	1,000 VAC, 50/60 Hz for 1 min between connector terminals and case	
Degree of protection	IP67 (IEC 60529) Oil resistance equivalent to IP67g according to the former JEM standard. Note: The connector specifications are IP67 and IP65 (IEC 60529). (See Note.)	IP67 (IEC 60529) Oil resistance equivalent to IP67g according to the former JEM standard. Note: The connectors are not waterproof.
Vibration resistance	10 to 500 Hz, 1.5-mm double amplitude, acceleration: 100 m/s², 10 sweeps in each of 3 directions up/down, left/right, and forward/backward) for 11 minutes each	
Shock resistance	500 m/s², 3 times each in 6 directions (Total: 18 times)	
Dimensions	100 × 100 × 30 mm	
Material	ABS resin case, epoxy resin filler	
Weight	Approx. 1,100 g (with 12.5-m cable)	
Cable length	Standard lengths of 2 and 12.5 m	

Note : The ID Flag Sensor is not waterproof. Do not use it in an environment where mist is present.

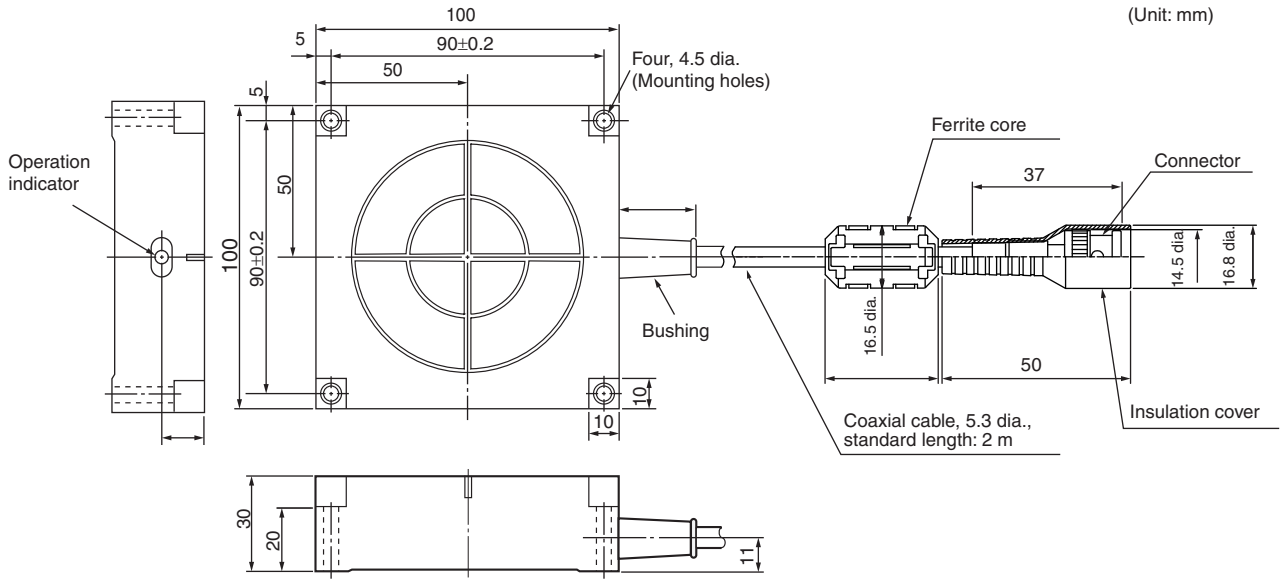
▪ Dimensions

V680-HS65-W



Case material	ABS resin
Filling resin	Epoxy resin
Cable	PVC (gray)

V680-HS65-R



Case material	ABS resin
Filling resin	Epoxy resin
Cable	PVC (black)

RF Tags

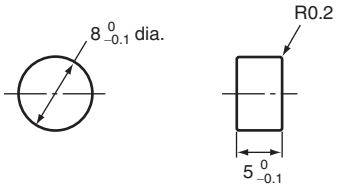
■ V680-D1KP52MT

▪ General Specifications

Item Model	V680-D1KP52MT
Memory capacity	1,000 bytes (user area)
Memory type	EEPROM
Data Retention	10 years after writing (85°C or less), 0.5 years after writing (85 to 125°C) Total data retention at high temperatures exceeding 125°C is 10 houres (See note.)
Write Endurance	100,000 times per block (25°C)
Ambient operating temperature when communicating	−25 to 85°C (with no icing)
Ambient storage temperature (with data retention)	−40 to 125°C (with no icing)
Ambient operating humidity	35% to 95%
Degree of protection	IP68 (IEC 60529) Oil resistance equivalent to IP67g according to the former JEM standard.
Vibration resistance	10 to 2,000 Hz, 1.5-mm double amplitude, acceleration: 150 m/s², 10 sweeps each in X, Y, and Z directions for 15 minutes each
Shock resistance	500 m/s², 3 times each in X, Y, and Z directions (Total: 18 times)
Dimensions	8 dia. × 5 mm
Materials	Case: PPS resin, Filling resin: Epoxy resin
Weight	Approx. 0.5 g
Metal countermeasures	Yes

Note: After string data at high temperatures, rewrite the data even if changes are not required. In this manual, high temperatures are those exceeding 125°C up to 180°C.

▪ Dimensions



(Unit: mm)

Case material	PPS resin
Filling resin	Epoxy resin

CHECK! When embedding the V680-D1KP52MT into a metal surface, use the V680-HS51, V680-HS52 Antenna. Transmission will not be possible if the V680-HS63 Antenna is used.

CHECK! The side with the markings is the communications surface. Mount the RF Tag with this side facing the Antenna.

CHECK! The ID code is written in the memory of the RF Tag and may be affected by data retention characteristics at high temperatures. Take suitable precautions when using the READ ID command for RF Tags operating at high temperatures.

▪ RF Tag Heat Resistivity

- Storing RF Tags under high temperatures will adversely affect the performance of the internal parts and the service life of the RF Tags.
- An LTPD of 10% was determined during the evaluation for RF Tags that reached the end of their life after testing under the following test conditions.

Heat cycle	−10°C/150°C, 30 minutes each for 1,000 cycles
	−10°C/180°C, 30 minutes each for 200 cycles
High temperatures	150°C 1,000 hours
	180°C, 200 hours

CHECK! LTPD: Lot tolerance percent defective
The lower limit of the malfunction rate for lots to be considered unacceptable during reliability testing.

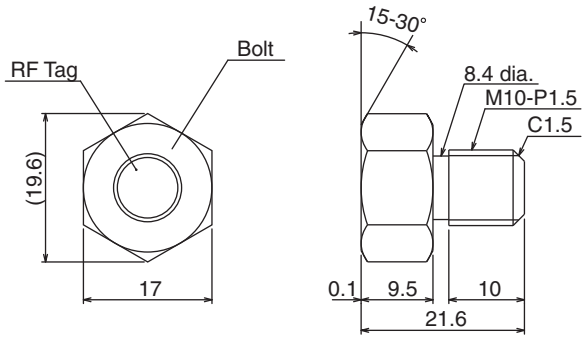
■ V680-D1KP52M-BT01

▪ General Specifications

Item / Model	V680-D1KP52M-BT01
Memory capacity	1,000 bytes (user area)
Memory type	EEPROM
Data Retention	10 years after writing (85°C or less), 0.5 years after writing (85 to 125°C) Total data retention at high temperatures exceeding 125°C is 10 houres (See note.)
Write Endurance	100,000 times per block (25°C)
Ambient operating temperature when communicating	−25 to 85°C (with no icing)
Ambient storage temperature (with data retention)	−40 to 125°C (with no icing)
Ambient operating humidity	35% to 95%
Degree of protection	IP68 (IEC 60529) Oil resistance equivalent to IP67g according to the former JEM standard.
Vibration resistance	10 to 2,000 Hz, 1.5-mm double amplitude, acceleration: 150 m/s², 10 sweeps each in X, Y, and Z directions for 15 minutes each
Shock resistance	500 m/s², 3 times each in X, Y, and Z directions (Total: 18 times)
Dimensions	Hex Head: 17 HEX × 9.5 mm, Screw: M10 × 10 mm
Materials	Bolt: SUS303, Case(RF Tag): PPS resin, Filling resin(RF Tag): Epoxy resin
Weight	Approx. 25 g
Metal countermeasures	Yes

▪ Dimensions

(Unit: mm)



Bolt material	SUS303
Case materia (RF Tag)	PPS resin
Filling resin (RF Tag)	Epoxy resin

CHECK! The side with the markings is the communications surface. Mount the RF Tag with this side facing the Antenna.

CHECK! The ID code is written in the memory of the RF Tag and may be affected by data retention characteristics at high temperatures. Take suitable precautions when using the READ ID command for RF Tags operating at high temperatures.

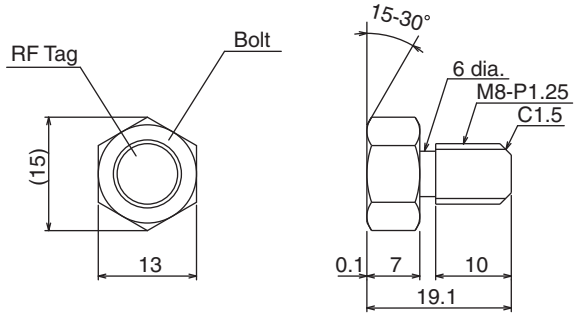
■ V680-D1KP52M-BT11

▪ General Specifications

Item Model	V680-D1KP52M-BT11
Memory capacity	1,000 bytes (user area)
Memory type	EEPROM
Data Retention	10 years after writing (85°C or less), 0.5 years after writing (85 to 125°C) Total data retention at high temperatures exceeding 125°C is 10 houres (See note.)
Write Endurance	100,000 times per block (25°C)
Ambient operating temperature when communicating	−25 to 85°C (with no icing)
Ambient storage temperature (with data retention)	−40 to 125°C (with no icing)
Ambient operating humidity	35% to 95%
Degree of protection	IP68 (IEC 60529) Oil resistance equivalent to IP67g according to the former JEM standard.
Vibration resistance	10 to 2,000 Hz, 1.5-mm double amplitude, acceleration: 150 m/s², 10 sweeps each in X, Y, and Z directions for 15 minutes each
Shock resistance	500 m/s², 3 times each in X, Y, and Z directions (Total: 18 times)
Dimensions	Hex Head: 13 HEX × 7 mm, Screw: M8 × 10 mm
Materials	Bolt: SUS303, Case(RF Tag): PPS resin, Filling resin(RF Tag): Epoxy resin
Weight	Approx. 10 g
Metal countermeasures	Yes

▪ Dimensions

(Unit: mm)



Bolt material	SUS303
Case material (RF Tag)	PPS resin
Filling resin (RF Tag)	Epoxy resin

CHECK! The side with the markings is the communications surface. Mount the RF Tag with this side facing the Antenna.

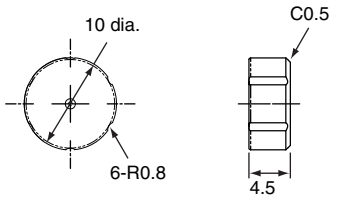
CHECK! The ID code is written in the memory of the RF Tag and may be affected by data retention characteristics at high temperatures. Take suitable precautions when using the READ ID command for RF Tags operating at high temperatures.

■ V680-D1KP53M

▪ General Specifications

Item Model	V680-D1KP53M
Memory capacity	1,000 bytes (user area)
Memory type	EEPROM
Data Retention	10 years after writing (85°C or less), 0.5 years after writing (85 to 125°C)
Write Endurance	100,000 times per block (25°C)
Ambient operating temperature when communicating	−25 to 85°C (with no icing)
Ambient storage temperature (with data retention)	−40 to 125°C (with no icing)
Ambient operating humidity	35% to 95%
Degree of protection	IP68 (IEC 60529) Oil resistance equivalent to IP67g according to the former JEM standard.
Vibration resistance	10 to 2,000 Hz, 1.5-mm double amplitude, acceleration: 150 m/s², 10 sweeps each in X, Y, and Z directions for 15 minutes each
Shock resistance	500 m/s², 3 times each in X, Y, and Z directions (Total: 18 times)
Dimensions	10 dia. × 4.5 mm (DIN698373)
Materials	Case: PPS resin, Filling resin: Epoxy resin
Weight	Approx. 1.0 g
Metal countermeasures	Yes

▪ Dimensions



Case material	PPS resin
Filling resin	Epoxy resin

CHECK! When embedding the V680-D1KP53M into a metal surface, use the V680-HS51, V680-HS52 Antenna. Transmission will not be possible if the V680-HS63 Antenna is used.

CHECK! The side with the markings is the communications surface. Mount the RF Tag with this side facing the Antenna.

■ V680-D1KP66T/-D1KP66MT

▪ General Specifications

Item / Model	V680-D1KP66T	V680-D1KP66MT
Memory capacity	1,000 bytes (user area)	
Memory type	EEPROM	
Data Retention	10 years after writing (85°C or less), 2.5 years after writing (85 to 125°C) Total data retention at high temperatures exceeding 125°C is 10 houres (See note.)	
Write Endurance	100,000 times per block (25°C)	
Ambient operating temperature when communicating	−25 to 85°C (with no icing)	
Ambient storage temperature (with data retention)	−40 to 125°C (with no icing)	
Ambient operating humidity	35% to 95%	
Degree of protection	IP68 (IEC 60529) Oil resistance equivalent to IP67g according to the former JEM standard.	
Vibration resistance	10 to 2,000 Hz, 1.5-mm double amplitude, acceleration: 150 m/s², 10 sweeps each in X, Y, and Z directions for 15 minutes each	
Shock resistance	500 m/s², 3 times each in X, Y, and Z directions (Total: 18 times)	
Dimensions	34 × 34 × 3.5 mm	
Materials	Case: PPS resin	
Weight	Approx. 6 g	Approx. 7.5 g
Metal countermeasures	None	Yes

Note: After string data at high temperatures, rewrite the data even if changes are not required. In this manual, high temperatures are those exceeding 125°C up to 180°C.

The V680-D1KP66MT is designed to be mounted directly to metal. The V680-D1KP66T and V680-D1KP66MT markings are shown in the following diagrams.

● V680-D1KP66MT

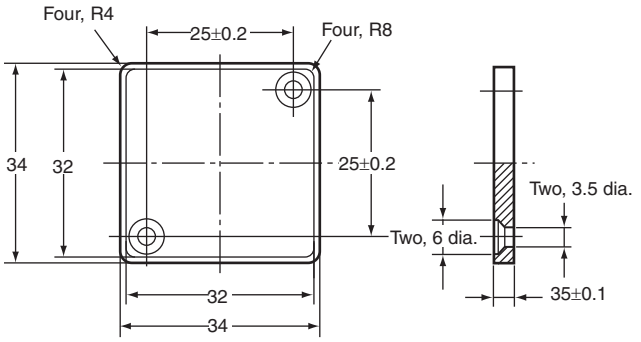
● V680-D1KP66T

CHECK! The side with the markings is the communications surface. Mount the RF Tag with this side facing the Antenna.

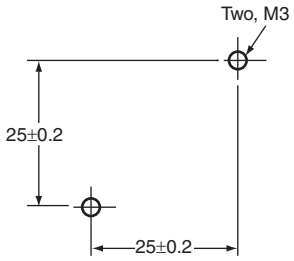
CHECK! The ID code is written in the memory of the RF Tag and may be affected by data retention characteristics at high temperatures. Take suitable precautions when using the READ ID command for RF Tags operating at high temperatures.

▪ Dimensions

V680-D1KP66T/-D1KP66MT



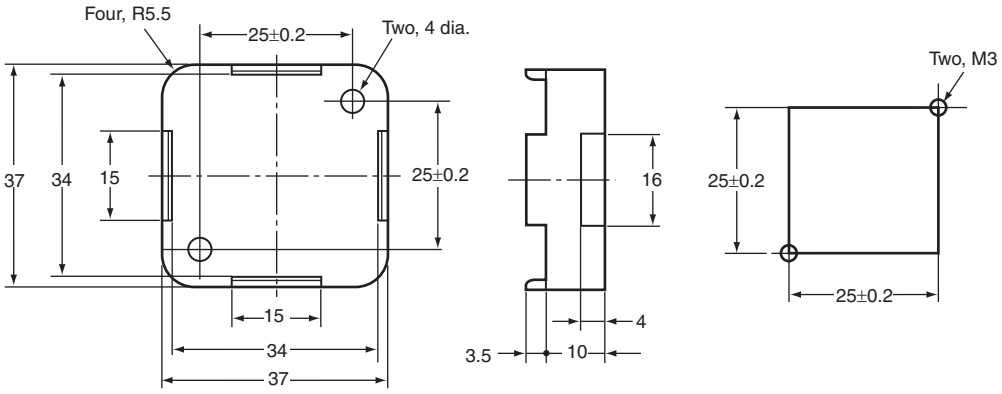
Mouting Hole Dimensions (Unit: mm)



Case material	PPS resin

V600-A86 Attachment

(Unit: mm)



Case material	PPS resin

▪ RF Tag Heat Resistivity

- Storing RF Tags under high temperatures will adversely affect the performance of the internal parts and the service life of the RF Tags.
- An LTPD of 10% was determined during the evaluation for RF Tags that reached the end of their life after testing under the following test conditions.

Heat cycle	−10°C/150°C, 30 minutes each for 1,000 cycles
	−10°C/180°C, 30 minutes each for 200 cycles
High temperatures	150°C 1,000 hours
	180°C, 200 hours

CHECK!

LTPD: Lot tolerance percent defective
The lower limit of the malfunction rate for lots to be considered unacceptable during reliability testing.

■ V680-D1KP66T-SP

▪ General Specifications

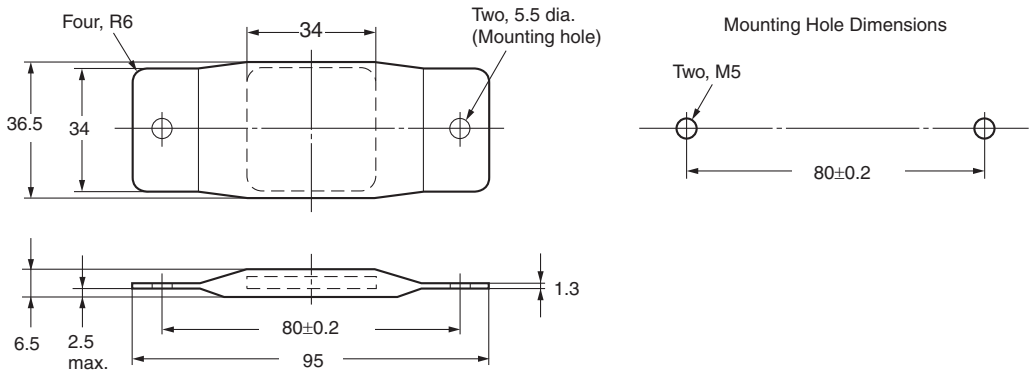
Item	Specifications
Memory capacity	1,000 bytes
Memory type	EEPROM
Data Retention	10 years after writing (85°C or less)
Write Endurance	100,000 times per block (25°C)
Ambient operating temperature	When communicating: −25 to 70°C (with no icing) When not communicating: −40 to 110°C (with no icing)
Ambient operating humidity	35% to 95% (with no condensation)
Ambient storage temperature	−40 to 110°C (with no icing)
Ambient storage humidity	35% to 95% (with no condensation)
Vibration resistance	10 to 2,000 Hz, 1.5-mm double amplitude, acceleration: 150 m/s^2, 10 sweeps each in X, Y, and Z directions for 15 minutes each
Shock resistance	500 m/s^2, 3 times each in 6 directions (Total: 18 times)
Dimensions	95 × 36.5 × 6.5 mm (excluding protruding parts)
Degree of protection	IP67
Material	External coating: Fluororesin (PFA) RF Tag body: PPS resin
Weight	Approx. 20 g
Mounting method	Two M5 screws
Metal countermeasures	None

CHECK!

The side with the markings is the communications surface. Mount the RF Tag with this side facing the Antenna.

▪ Dimensions

(Unit: mm)



Case material	PFA resin

■ V680-D2KF52M

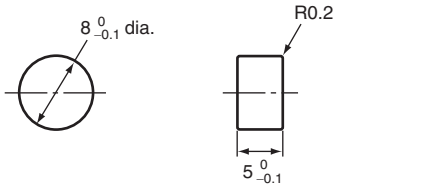
▪ General Specifications

Item / Model	V680-D2KF52M
Memory capacity	2,000 bytes (user area)
Memory type	FRAM
Data Retention	10 years after writing (55°C or less), 2.9 years after writing (85°C max.)
Write Endurance	10 billion times per block. Access frequency (See note): 10 billion times
Ambient operating temperature	−25 to 85°C (with no icing)
Ambient storage temperature	−40 to 85°C (with no icing)
Ambient operating humidity	35% to 95%
Degree of protection	IP67 (IEC 60529) Oil resistance equivalent to IP67g according to the former JEM standard.
Vibration resistance	10 to 2,000 Hz, 1.5-mm double amplitude, acceleration: 150 m/s^2, 10 sweeps each in X, Y, and Z directions for 15 minutes each
Shock resistance	500 m/s^2, 3 times each in X, Y, and Z directions (Total: 18 times)
Dimensions	8 dia. × 5 mm
Materials	Case: PPS resin, Filling resin: Epoxy resin
Weight	Approx. 0.5 g
Metal countermeasures	Yes

Note: The total communications frequency of the Read or Write is called an access frequency.

▪ Dimensions

(Unit: mm)



Case material	PPS resin
Filling resin	Epoxy resin

CHECK! When embedding the V680-D1KP52MT into a metal surface, use the V680-HS51, V680-HS52 Antenna. Transmission will not be possible if the V680-HS63 Antenna is used.

CHECK! The side with the markings is the communications surface. Mount the RF Tag with this side facing the Antenna.

■ V680-D2KF52M-BT01

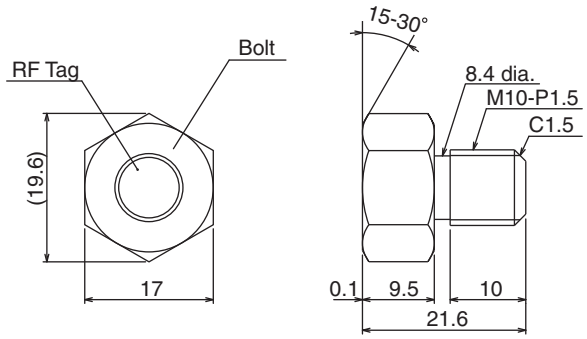
▪ General Specifications

Item / Model	V680-D2KF52M-BT01
Memory capacity	2,000 bytes (user area)
Memory type	FRAM
Data Retention	10 years after writing (55°C or less), 2.9 years after writing (85°C max.)
Write Endurance	10 billion times per block. Access frequency (See note): 10 billion times
Ambient operating temperature	−25 to 85°C (with no icing)
Ambient storage temperature	−40 to 85°C (with no icing)
Ambient operating humidity	35% to 95%
Degree of protection	IP67 (IEC 60529) Oil resistance equivalent to IP67g according to the former JEM standard.
Vibration resistance	10 to 2,000 Hz, 1.5-mm double amplitude, acceleration: 150 m/s², 10 sweeps each in X, Y, and Z directions for 15 minutes each
Shock resistance	500 m/s², 3 times each in X, Y, and Z directions (Total: 18 times)
Dimensions	Hex Head: 17 HEX × 9.5 mm, Screw: M10 × 10 mm
Materials	Bolt: SUS303, Case(RF Tag): PPS resin, Filling resin(RF Tag): Epoxy resin
Weight	Approx. 25 g
Metal countermeasures	Yes

Note: The total communications frequency of the Read or Write is called an access frequency.

▪ Dimensions

(Unit: mm)



Bolt material	SUS303
Case material (RF Tag)	PPS resin
Filling resin (RF Tag)	Epoxy resin

CHECK!

The side with the markings is the communications surface. Mount the RF Tag with this side facing the Antenna.

■ V680-D2KF52M-BT11

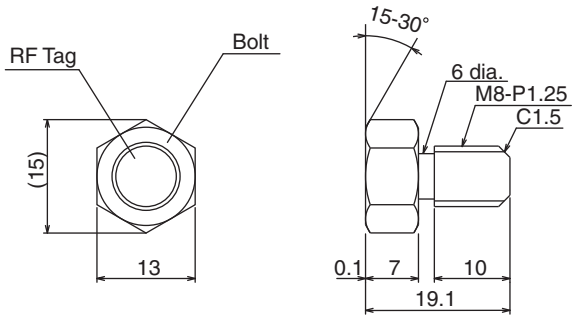
▪ General Specifications

Item Model	V680-D2KF52M-BT11
Memory capacity	2,000 bytes (user area)
Memory type	FRAM
Data Retention	10 years after writing (55°C or less), 2.9 years after writing (85°C max.)
Write Endurance	10 billion times per block. Access frequency (See note): 10 billion times
Ambient operating temperature	−25 to 85°C (with no icing)
Ambient storage temperature	−40 to 85°C (with no icing)
Ambient operating humidity	35% to 95%
Degree of protection	IP67 (IEC 60529) Oil resistance equivalent to IP67g according to the former JEM standard.
Vibration resistance	10 to 2,000 Hz, 1.5-mm double amplitude, acceleration: 150 m/s^2, 10 sweeps each in X, Y, and Z directions for 15 minutes each
Shock resistance	500 m/s^2, 3 times each in X, Y, and Z directions (Total: 18 times)
Dimensions	Hex Head: 13 HEX × 7 mm, Screw: M8 × 10 mm
Materials	Bolt: SUS303, Case(RF Tag): PPS resin, Filling resin(RF Tag): Epoxy resin
Weight	Approx. 10 g
Metal countermeasures	Yes

Note: The total communications frequency of the Read or Write is called an access frequency.

▪ Dimensions

(Unit: mm)



Bolt material	SUS303
Case material (RF Tag)	PPS resin
Filling resin (RF Tag)	Epoxy resin

CHECK! The side with the markings is the communications surface. Mount the RF Tag with this side facing the Antenna.

■ V680-D2KF67/-D2KF67M

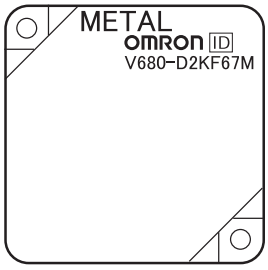
▪ General Specifications

Item / Model	V680-D2KF67	V680-D2KF67M
Memory capacity	2,000 bytes (user area)	
Memory type	FRAM	
Data Retention	10 years after writing (55°C or less), 2.9 years after writing (85°C max.)	
Write Endurance	10 billion times per block. Access frequency (See note.): 10 billion times	
Ambient operating temperature	−25 to 85°C (with no icing)	
Ambient storage temperature	−40 to 85°C (with no icing)	
Ambient operating humidity	35% to 85%	
Degree of protection	P67 (IEC 60529) Oil resistance equivalent to IP67g according to the former JEM standard.	
Vibration resistance	10 to 2,000 Hz, 1.5-mm double amplitude, acceleration: 150 m/s^2,10 sweeps each in X, Y, and Z directions for 15 minutes each	
Shock resistance	500 m/s^2, 3 times each in X, Y, and Z directions (Total: 18 times)	
Dimensions	40 × 40 × 4.5 mm	
Materials	Case: PBT resin	
Weight	Approx. 6.5 g	Approx. 7 g
Metal countermeasures	None	Yes

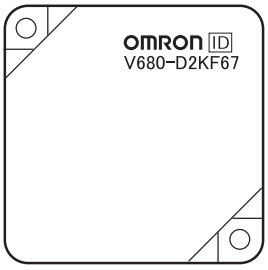
Note: The total communications frequency of the Read or Write is called an access frequency.

The V680-D2KF67M is designed to be mounted directly to metal. The V680-D2KF67 and V680-D2KF67M markings are shown in the following diagrams.

- V680-D2KF67M



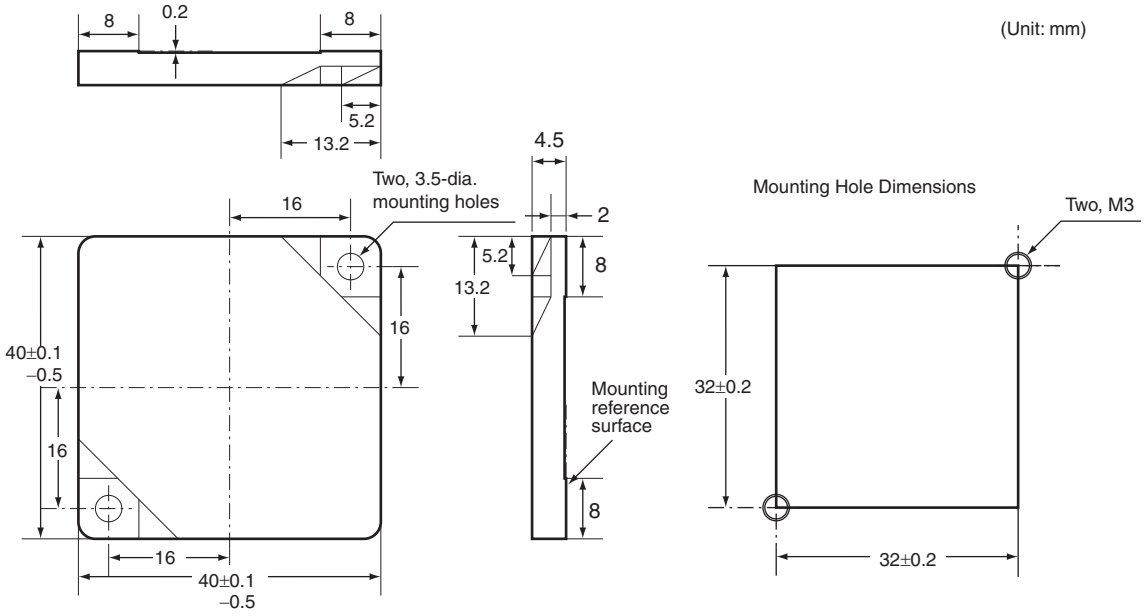
- V680-D2KF67



CHECK!

The side with the markings is the communications surface. Mount the RF Tag with this side facing the Antenna.

▪ Dimensions



Case material	PBT resin
Filling resin	Epoxy resin

■ V680-D8KF67/-D8KF67M

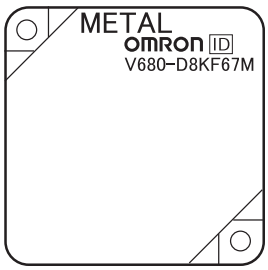
▪ General Specifications

Item / Model	V680-D8KF67	V680-D8KF67M
Memory capacity	8,192 bytes (user area)	
Memory type	FRAM	
Data Retention	10 years after writing (70°C max.), 6 years after writing (85°C max.)	
Write Endurance	10 billion times per block. Access frequency (See note.): 10 billion times	
Ambient operating temperature	−20 to 85°C (with no icing)	
Ambient storage temperature	−40 to 85°C (with no icing)	
Ambient operating humidity	35% to 85%	
Degree of protection	P67 (IEC 60529) Oil resistance equivalent to IP67g according to the former JEM standard.	
Vibration resistance	10 to 2,000 Hz, 1.5-mm double amplitude, acceleration: 150 m/s^2,10 sweeps each in X, Y, and Z directions for 15 minutes each	
Shock resistance	500 m/s^2, 3 times each in X, Y, and Z directions (Total: 18 times)	
Dimensions	40 × 40 × 4.5 mm	
Materials	Case: PBT resin	
Weight	Approx. 8 g	Approx. 8.5 g
Metal countermeasures	None	Yes

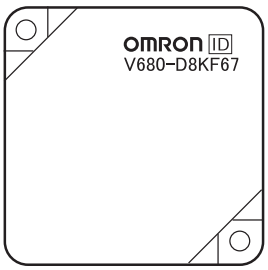
Note: The total communications frequency of the Read or Write is called an access frequency.

The V680-D8KF67M is designed to be mounted directly to metal. The V680-D8KF67 and V680-D2KF67M markings are shown in the following diagrams.

- V680-D8KF67M



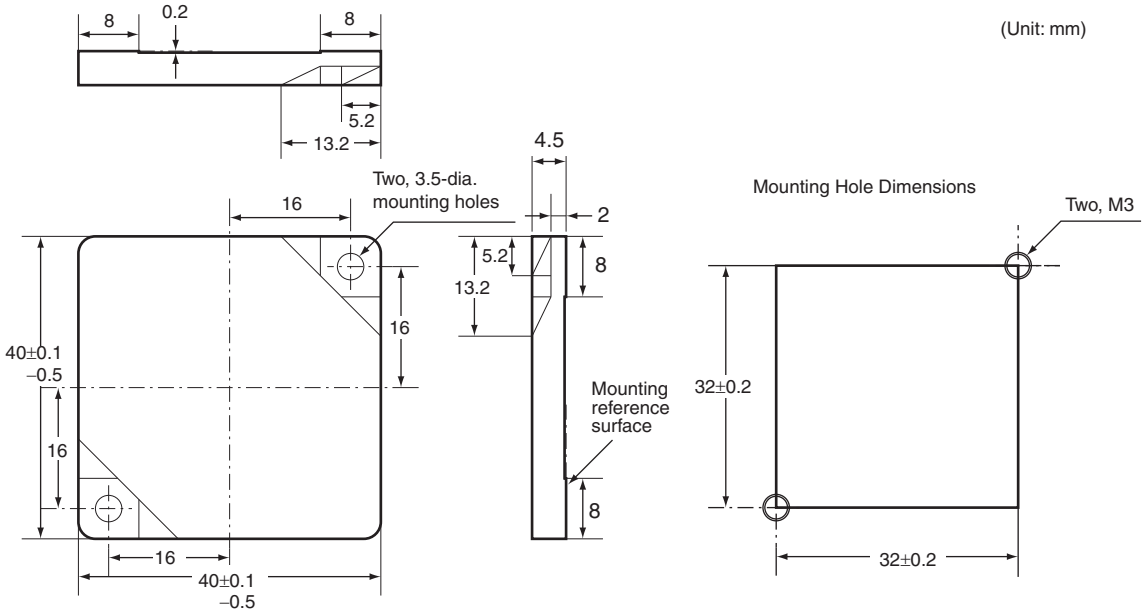
- V680-D8KF67



CHECK!

The side with the markings is the communications surface. Mount the RF Tag with this side facing the Antenna.

▪ Dimensions



Case material	PBT resin
Filling resin	Epoxy resin

■ V680-D8KF68/-D32KF68

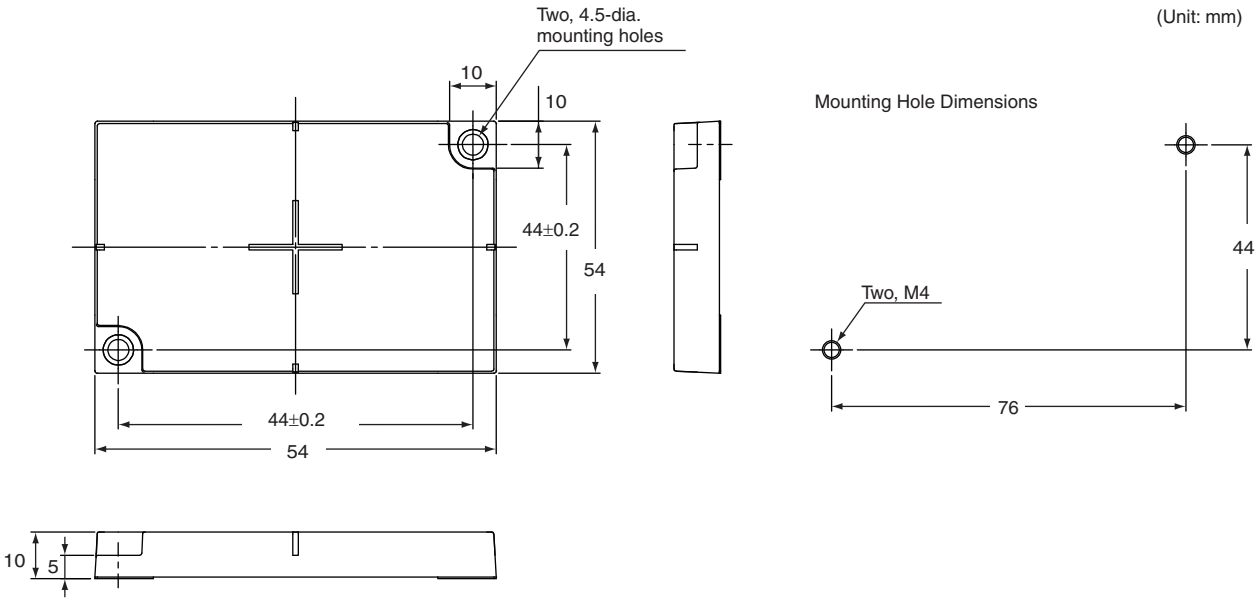
▪ General Specifications

Item / Model	V680-D8KF68	V680-D32KF68
Memory capacity	8,192 bytes (user area)	32,744 bytes (user area)
Memory type	FRAM	
Data Retention	10 years after writing (70°C max.), 6 years after writing (85°C max.)	
Write Endurance	10 billion times per block (85°C or less) Access frequency (See note.): 10 billion times	
Ambient operating temperature	−20 to 85°C (with no icing)	
Ambient storage temperature	−40 to 85°C (with no icing)	
Ambient operating humidity	35% to 85%	
Degree of protection	P67 (IEC 60529) Oil resistance equivalent to IP67g according to the former JEM standard.	
Vibration resistance	10 to 500 Hz, 1.5-mm double amplitude, acceleration: 100 m/s², 10 sweeps each in X, Y, and Z directions for 11 minutes each	
Shock resistance	500 m/s², 3 times each in X, Y, and Z directions (Total: 18 times)	
Dimensions	86 × 54 × 10 mm	
Materials	Case: PBT resin Filling resin: Epoxy resin	
Weight	Approx. 50 g	
Metal countermeasures	None	

Note: The total communications frequency of the Read or Write is called an access frequency.

▪ General Specifications

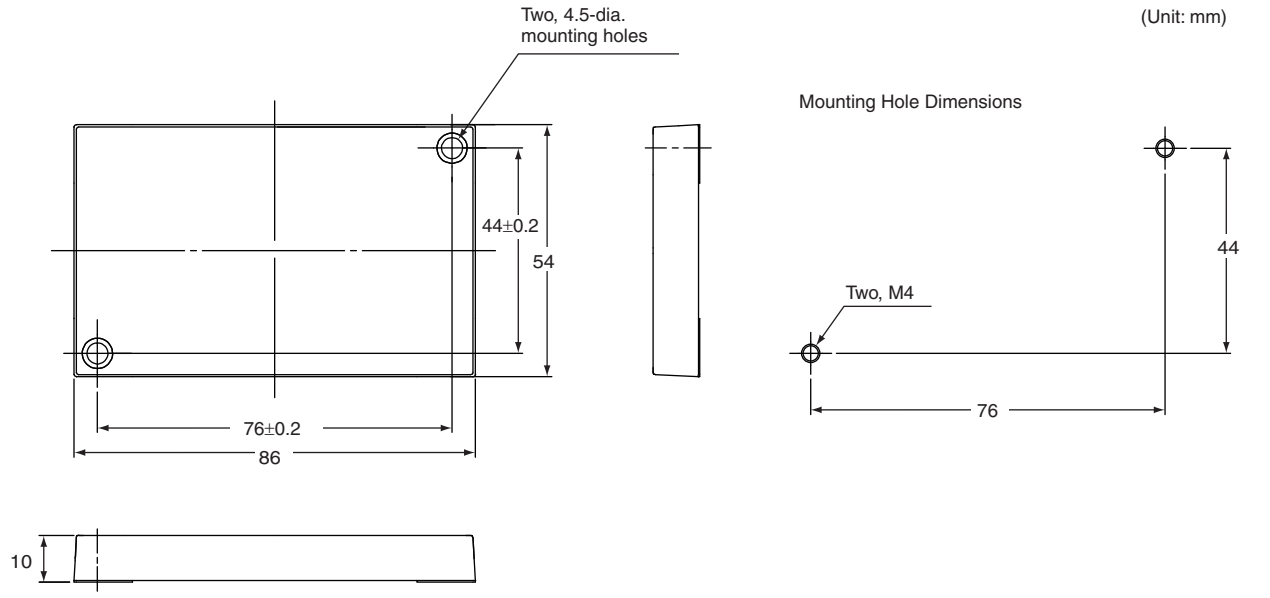
V680-D8KF68/-D32KF68



Case material	PBT resin
Filling resin	Epoxy resin

CHECK! The side with the markings is the communications surface. Mount the RF Tag with this side facing the Antenna.

V680-A81 Attachment



Case material	PBT resin
Filling resin	Epoxy resin

Characteristics

Communications Distance Specifications

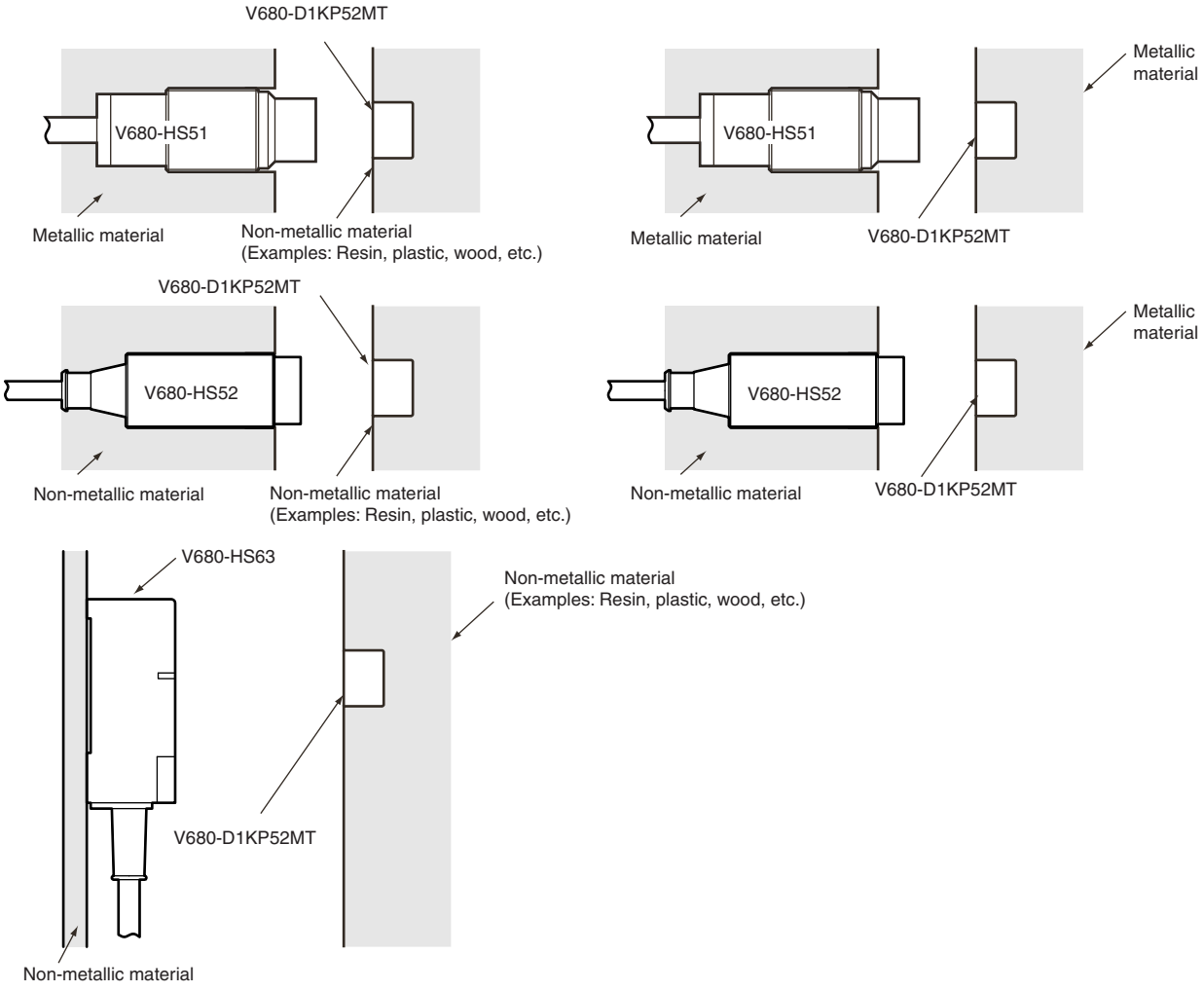
■ V680-D1KP52MT

Antenna	RF Tag	Communications distance	
V680-HS51	V680-D1KP52MT	Read	0.5 to 6.5 mm (Axis offset: ±2)
		Write	0.5 to 6.0 mm (Axis offset: ±2)
	V680-D1KP52MT embedded in metal (steel)	Read	0.5 to 3.5 mm (Axis offset: ±2)
		Write	0.5 to 3.0 mm (Axis offset: ±2)
V680-HS52	V680-D1KP52MT	Read	0.5 to 9.0 mm (Axis offset: ±2)
		Write	0.5 to 8.5 mm (Axis offset: ±2)
	V680-D1KP52MT embedded in metal (steel)	Read	0.5 to 4.5 mm (Axis offset: ±2)
		Write	0.5 to 4.0 mm (Axis offset: ±2)
V680-HS63	V680-D1KP52MT	Read	0.5 to 12.0 mm (Axis offset: ±2)
		Write	0.5 to 9.5 mm (Axis offset: ±2)

CHECK!

When embedding the V680-D1KP52MT into a metal surface, use the V680-HS51/-HS52 Antenna.
Transmission will not be possible if the V680-HS63 Antenna is used.

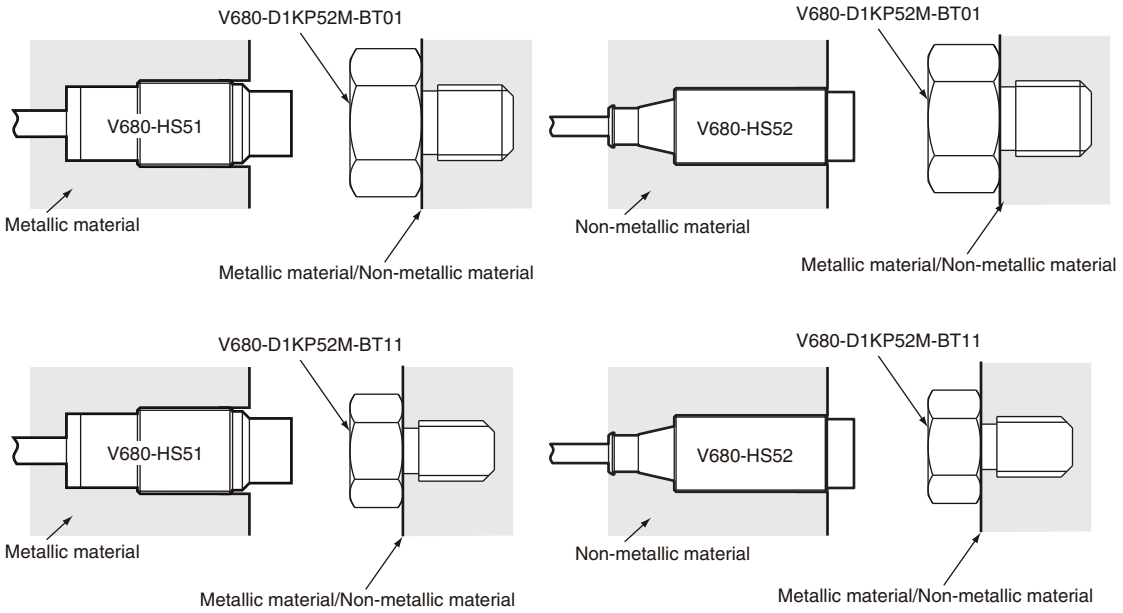
▪ Measurement Conditions



■ V680-D1KP52M-BT01/-D1KP52M-BT11

Antenna	RF Tag	Communications distance	
V680-HS51	V680-D1KP52M-BT01/-D1KP52M-BT11	Read	0.5 to 2.5 mm (Axis offset: ±2)
		Write	0.5 to 2.0 mm (Axis offset: ±2)
V680-HS52	V680-D1KP52M-BT01/-D1KP52M-BT11	Read	0.5 to 3.0 mm (Axis offset: ±2)
		Write	0.5 to 2.5 mm (Axis offset: ±2)

▪ Measurement Conditions



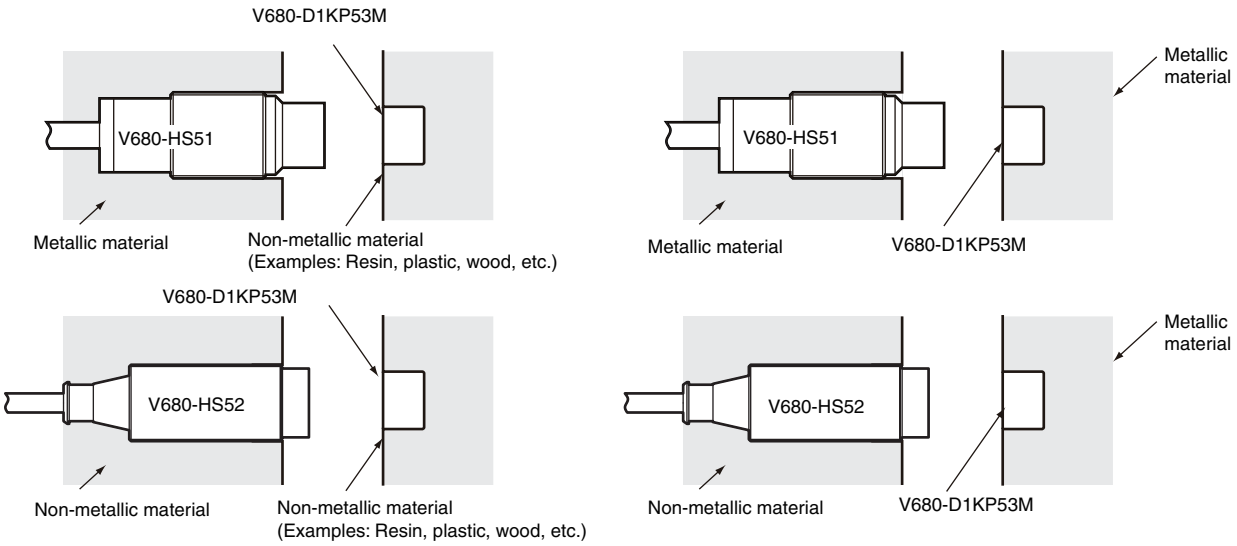
■ V680-D1KP53M

Antenna	RF Tag	Communications distance	
V680-HS51	V680-D1KP53M	Read	0.5 to 6.5 mm (Axis offset: ±2)
		Write	0.5 to 6.0 mm (Axis offset: ±2)
	V680-D1KP53M embedded in metal (steel)	Read	0.5 to 3.5 mm (Axis offset: ±2)
		Write	0.5 to 3.0 mm (Axis offset: ±2)
V680-HS52	V680-D1KP53M	Read	0.5 to 9.0 mm (Axis offset: ±2)
		Write	0.5 to 8.5 mm (Axis offset: ±2)
	V680-D1KP53M embedded in metal (steel)	Read	0.5 to 4.5 mm (Axis offset: ±2)
		Write	0.5 to 4.0 mm (Axis offset: ±2)

CHECK!

When embedding the V680-D1KP53M into a metal surface, use the V680-HS51/-HS52 Antenna. Transmission will not be possible if the V680-HS63 Antenna is used.

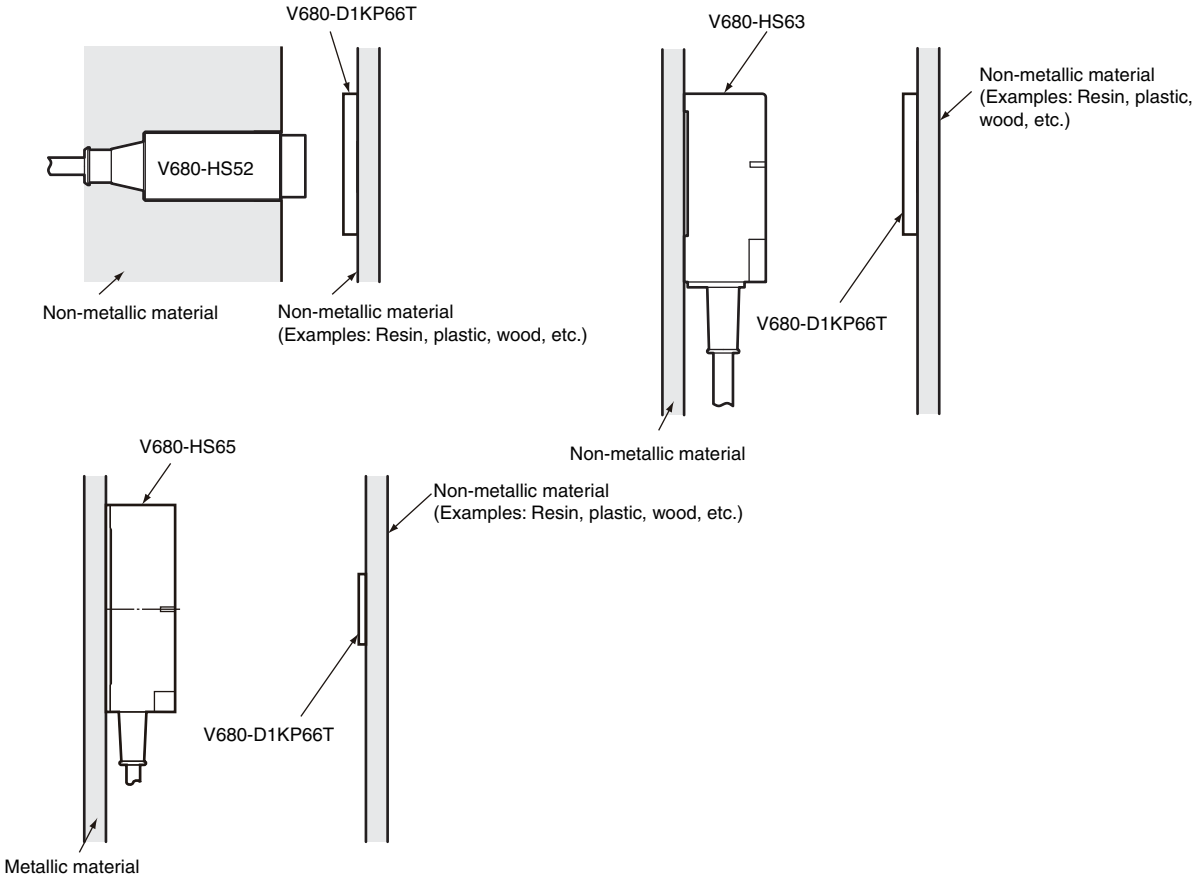
▪ Measurement Conditions



■ V680-D1KP66T

Antenna	RF Tag	Communications distance	
V680-HS52	V680-D1KP66T	Read	1.0 to 17.0 mm (Axis offset: ±2)
		Write	1.0 to 17.0 mm (Axis offset: ±2)
V680-HS63	V680-D1KP66T	Read	5.0 to 30.0 mm (Axis offset: ±10)
		Write	5.0 to 25.0 mm (Axis offset: ±10)
V680-HS65	V680-D1KP66T	Read	5.0 to 47.0 mm (Axis offset: ±10)
		Write	5.0 to 42.0 mm (Axis offset: ±10)

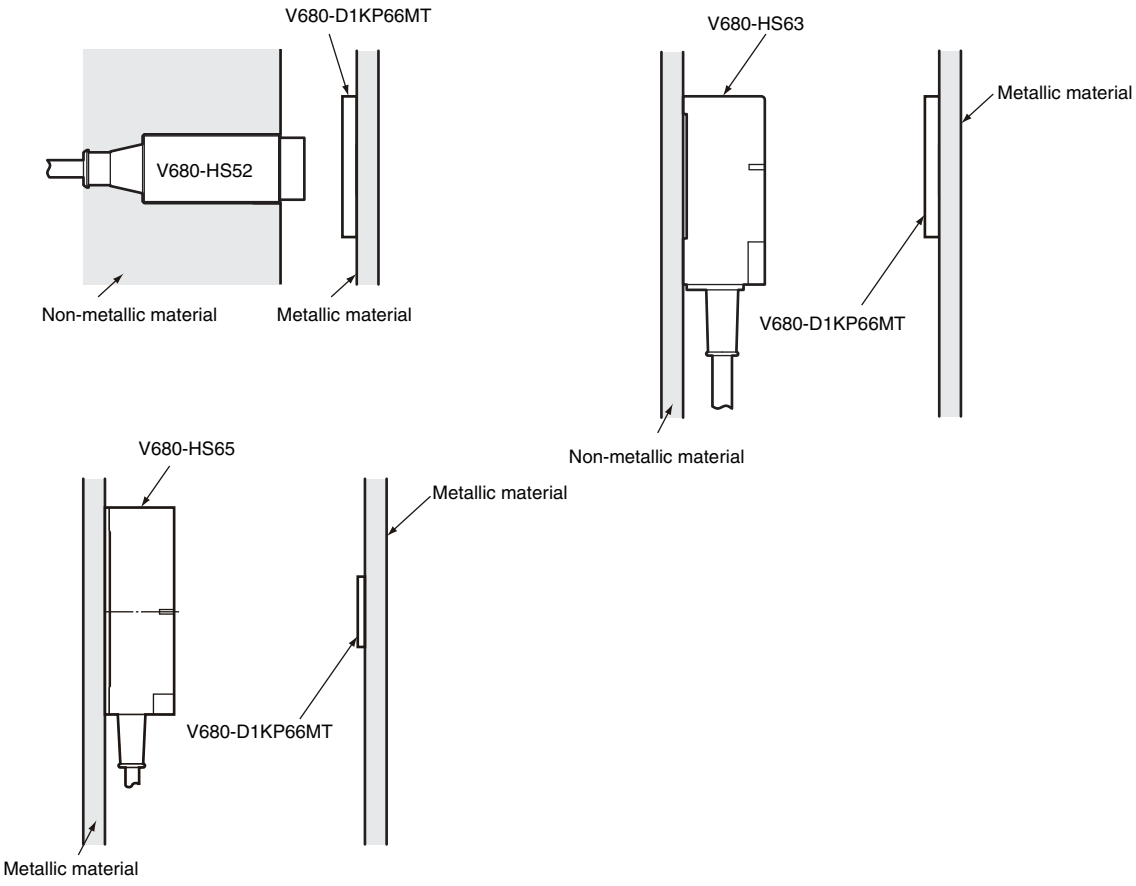
▪ Measurement Conditions



■ V680-D1KP66MT

Antenna	RF Tag	Communications distance	
V680-HS52	V680-D1KP66MT embedded in metal (steel)	Read	1.0 to 16.0 mm (Axis offset: ±2)
		Write	1.0 to 14.0 mm (Axis offset: ±2)
V680-HS63	V680-D1KP66MT embedded in metal (steel)	Read	5.0 to 25.0 mm (Axis offset: ±10)
		Write	5.0 to 20.0 mm Axis offset: ±10)
V680-HS65	V680-D1KP66MT embedded in metal (steel)	Read	5.0 to 25.0 mm (Axis offset: ±10)
		Write	5.0 to 20.0 mm (Axis offset: ±10)

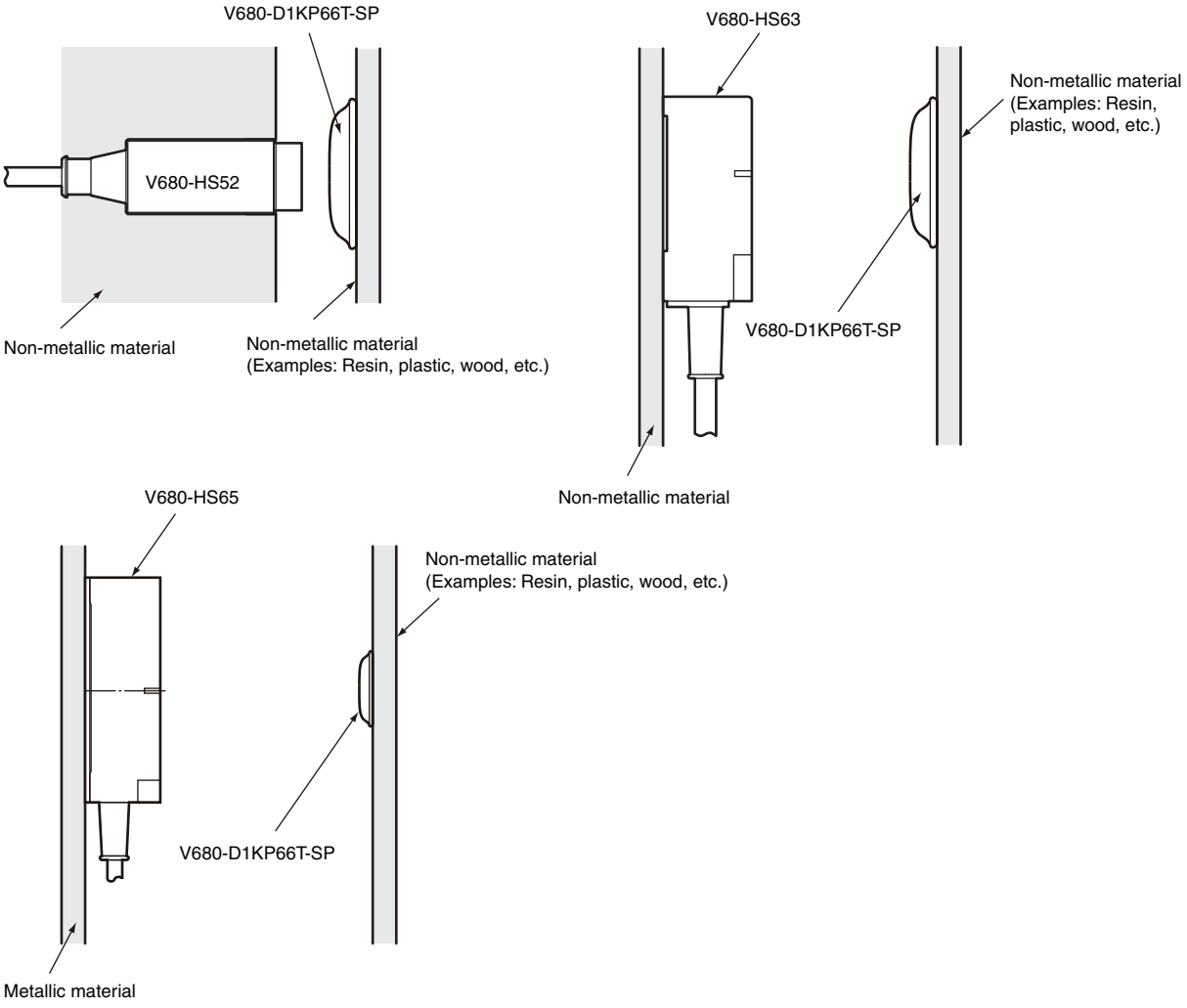
▪ Measurement Conditions



■ V680-D1KP66T-SP

Antenna	RF Tag	Communications distance	
V680-HS52	V680-D1KP66T-SP	Read	1.0 to 15.0 mm (Axis offset: ±2)
		Write	1.0 to 15.0 mm (Axis offset: ±2)
V680-HS63	V680-D1KP66T-SP	Read	5.0 to 25.0 mm (Axis offset: ±10)
		Write	5.0 to 20.0 mm (Axis offset: ±10)
V680-HS65	V680-D1KP66T-SP	Read	5.0 to 42.0 mm (Axis offset: ±10)
		Write	5.0 to 37.0 mm (Axis offset: ±10)

▪ Measurement Conditions



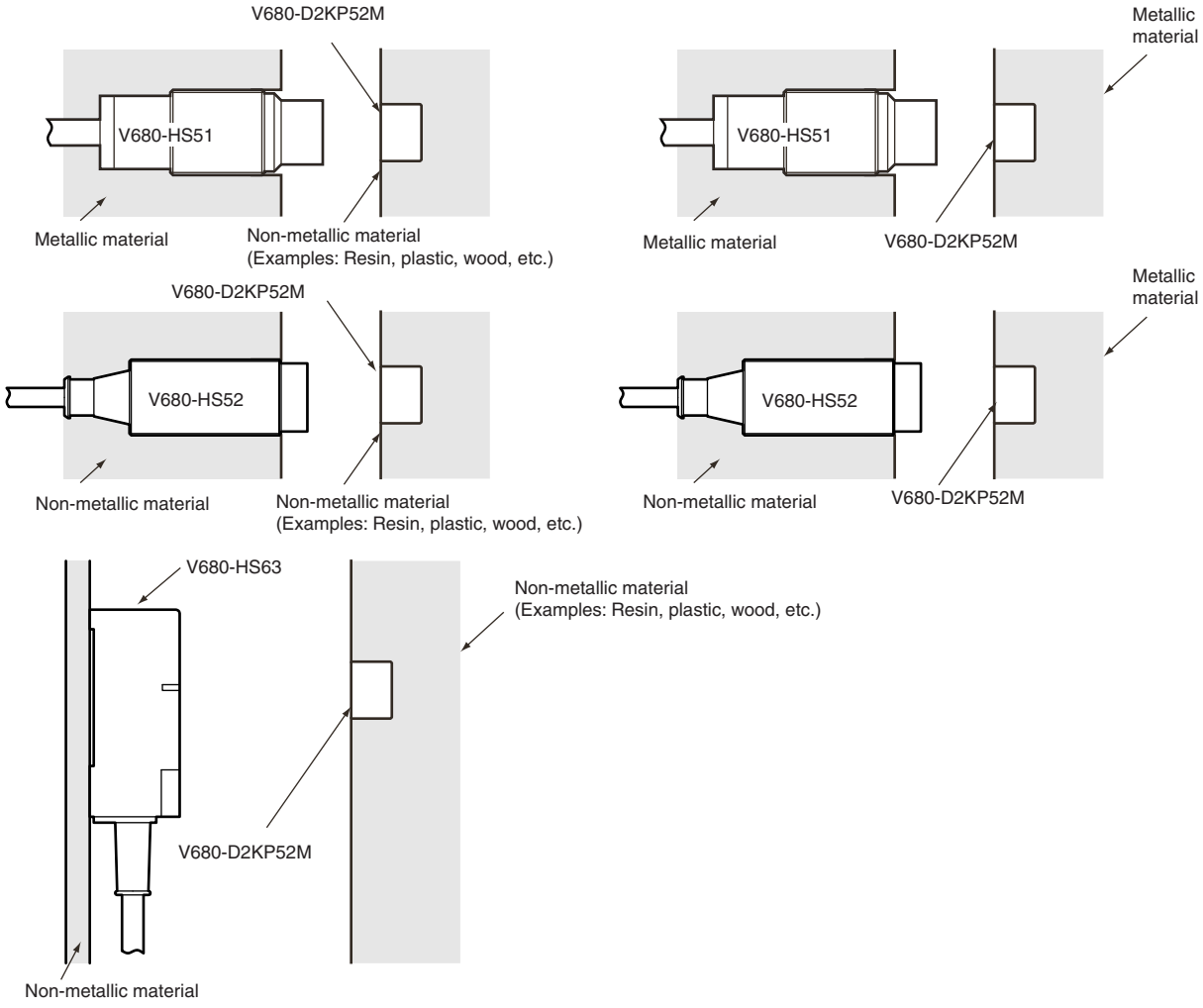
■ V680-D2KF52M

Antenna	RF Tag	Communications distance	
V680-HS51	V680-D2KF52M	Read	0.5 to 5.5 mm (Axis offset: ±2)
		Write	0.5 to 5.5 mm (Axis offset: ±2)
	V680-D2KF52M embedded in metal (steel)	Read	0.5 to 3.5 mm (Axis offset: ±2)
		Write	0.5 to 3.5 mm (Axis offset: ±2)
V680-HS52	V680-D2KF52M	Read	0.5 to 8.0 mm (Axis offset: ±2)
		Write	0.5 to 8.0 mm (Axis offset: ±2)
	V680-D2KF52M embedded in metal (steel)	Read	0.5 to 3.0 mm (Axis offset: ±2)
		Write	0.5 to 3.0 mm (Axis offset: ±2)
V680-HS63	V680-D2KF52M	Read	0.5 to 9.5 mm (Axis offset: ±2)
		Write	0.5 to 9.5 mm (Axis offset: ±2)

CHECK!

When embedding the V680-D2KP52M into a metal surface, use the V680-HS51/-HS52 Antenna. Transmission will not be possible if the V680-HS63 Antenna is used.

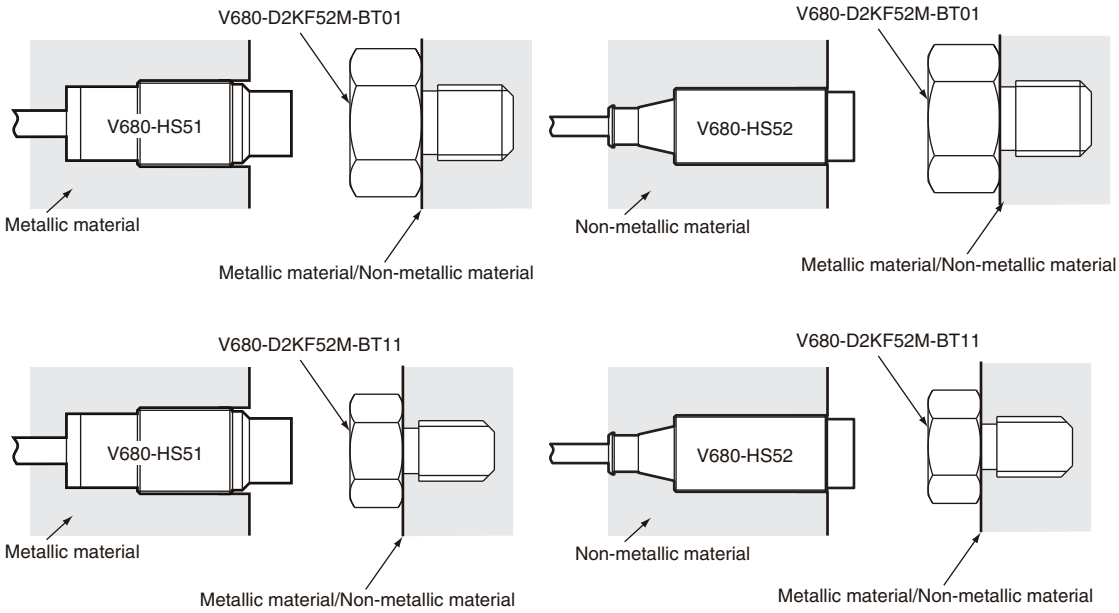
▪ Measurement Conditions



■ V680-D2KF52M-BT01/-D2KF52M-BT11

Antenna	RF Tag	Communications distance	
V680-HS51	V680-D2KF52M-BT01/-D2KF52M-BT11	Read	0.5 to 2.5 mm (Axis offset: ±2)
		Write	0.5 to 2.5 mm (Axis offset: ±2)
V680-HS52	V680-D2KF52M-BT01/-D2KF52M-BT11	Read	0.5 to 2.0 mm (Axis offset: ±2)
		Write	0.5 to 2.5 mm (Axis offset: ±2)

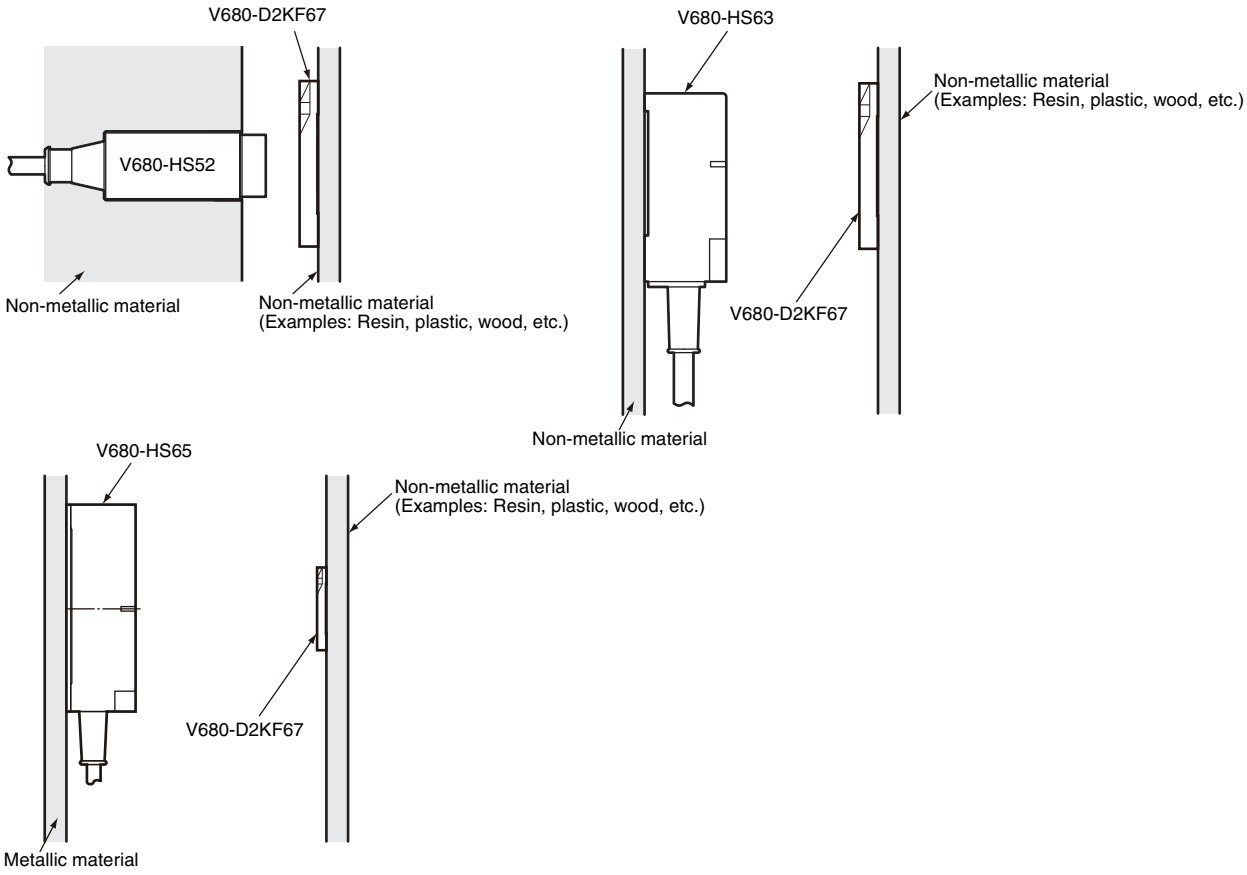
▪ Measurement Conditions



■ V680-D2KF67

Antenna	RF Tag	Communications distance	
V680-HS52	V680-D2KF67	Read	1.0 to 17.0 mm (Axis offset: ±2)
		Write	1.0 to 17.0 mm (Axis offset: ±2)
V680-HS63	V680-D2KF67	Read	7.0 to 30.0 mm (Axis offset: ±10)
		Write	7.0 to 30.0 mm (Axis offset: ±10)
V680-HS65	V680-D2KF67	Read	5.0 to 42.0 mm (Axis offset: ±10)
		Write	5.0 to 42.0 mm (Axis offset: ±10)

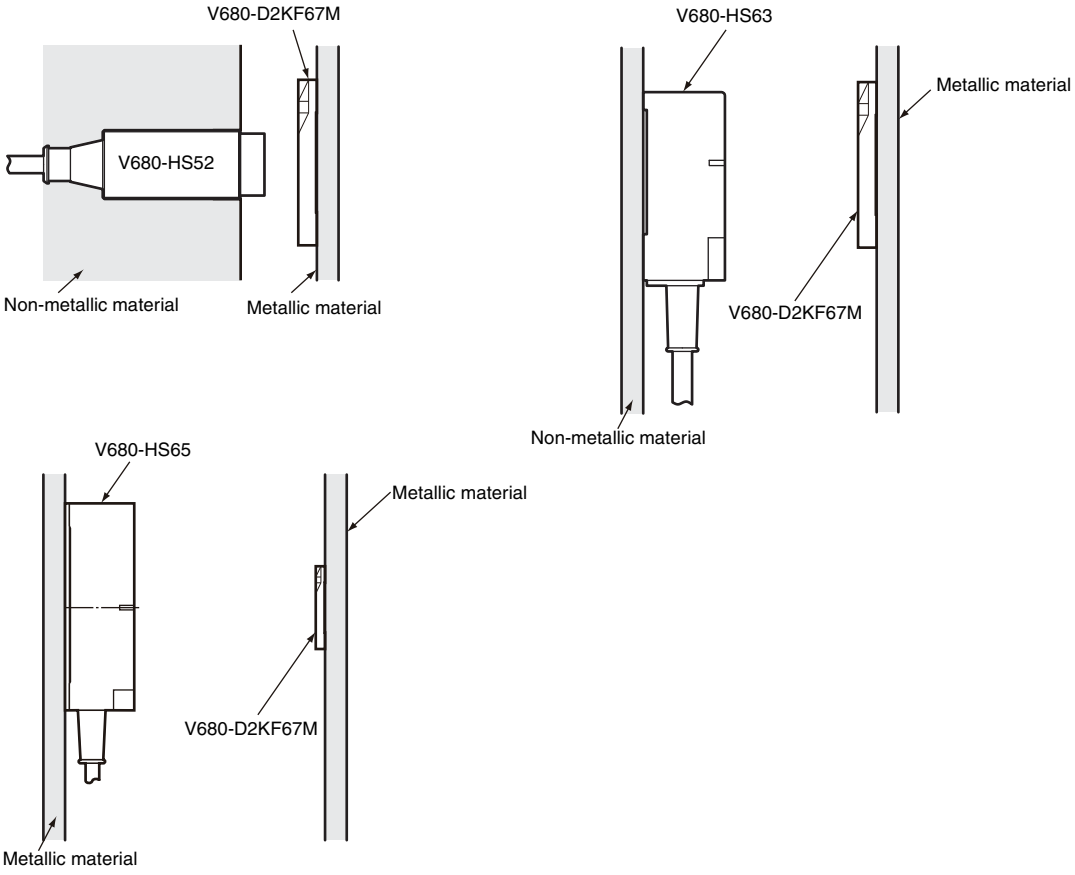
▪ Measurement Conditions



■ V680-D2KF67M

Antenna	RF Tag	Communications distance	
V680-HS52	V680-D2KF67M with metal on back (steel)	Read	1.0 to 16.0 mm (Axis offset: ±2)
		Write	1.0 to 16.0 mm (Axis offset: ±2)
V680-HS63	V680-D2KF67M with metal on back (steel)	Read	6.0 to 25.0 mm (Axis offset: ±10)
		Write	6.0 to 25.0 mm (Axis offset: ±10)
V680-HS65	V680-D2KF67M with metal on back (steel)	Read	5.0 to 25.0 mm (Axis offset: ±10)
		Write	5.0 to 25.0 mm (Axis offset: ±10)

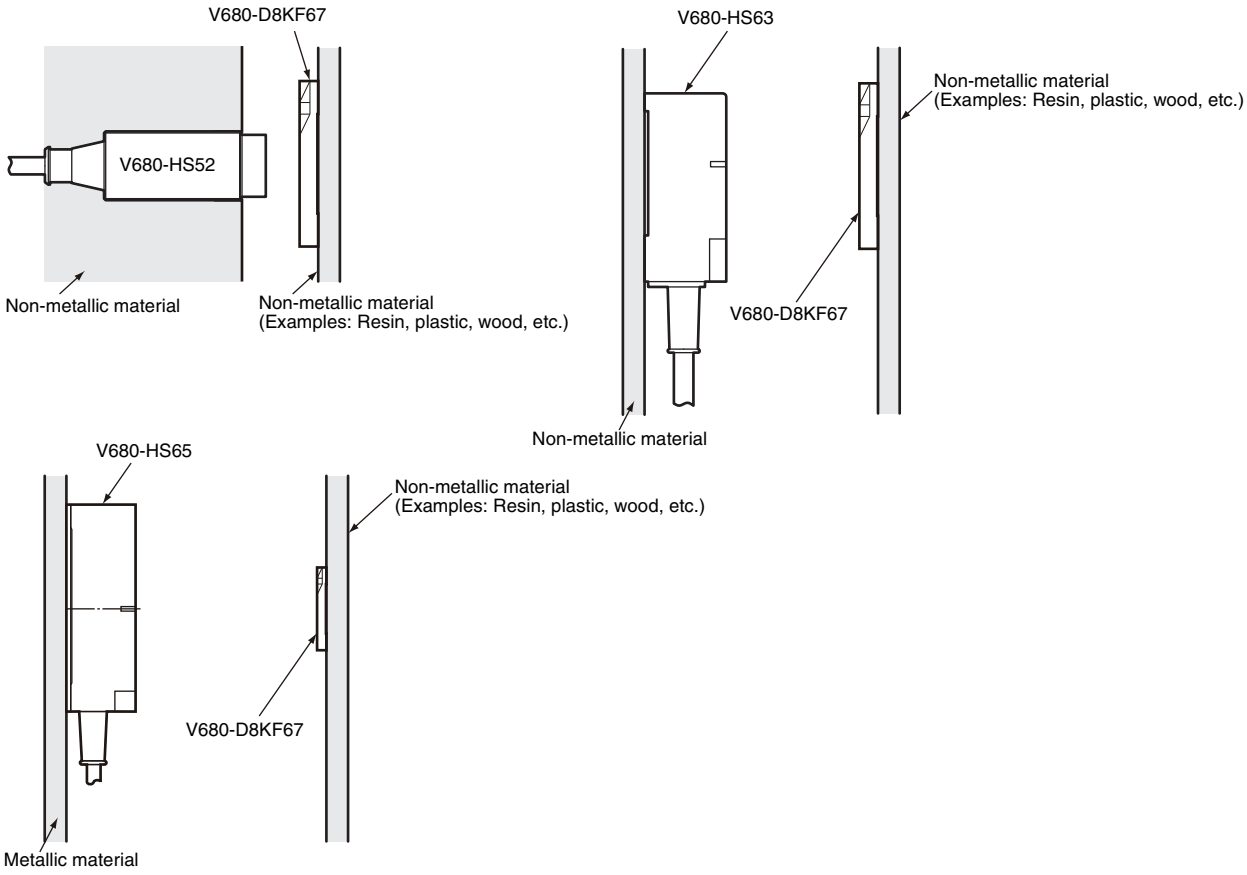
▪ Measurement Conditions



■ V680-D8KF67

Antenna	RF Tag	Communications distance	
V680-HS52	V680-D8KF67	Read	0 to 17.0 mm (Axis offset: ±2)
		Write	0 to 17.0 mm (Axis offset: ±2)
V680-HS63	V680-D8KF67	Read	0 to 30.0 mm (Axis offset: ±10)
		Write	0 to 30.0 mm (Axis offset: ±10)
V680-HS65	V680-D8KF67	Read	0 to 42.0 mm (Axis offset: ±10)
		Write	0 to 42.0 mm (Axis offset: ±10)

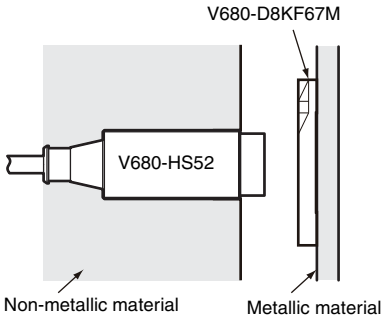
▪ Measurement Conditions

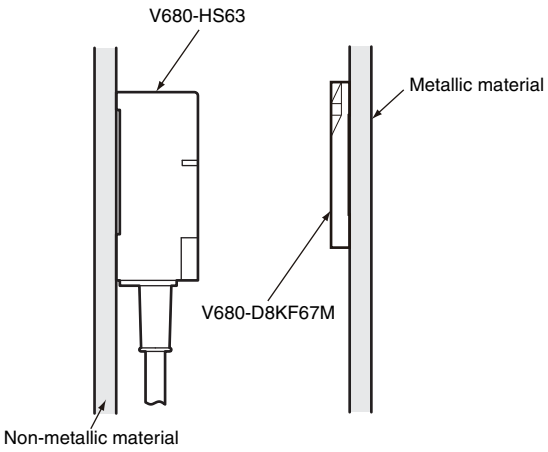


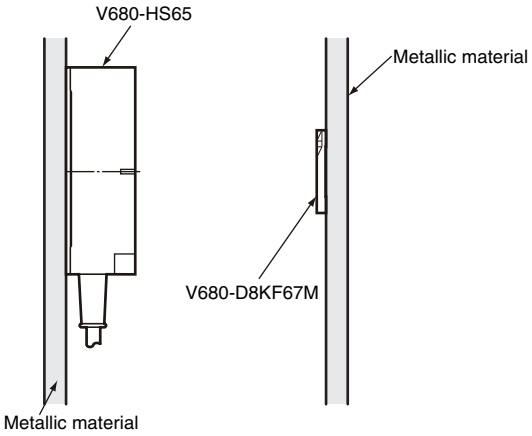
■ V680-D8KF67M

Antenna	RF Tag	Communications distance	
V680-HS52	V680-D8KF67M with metal on back (steel)	Read	0 to 16.0 mm (Axis offset: ±2)
		Write	0 to 16.0 mm (Axis offset: ±2)
V680-HS63	V680-D8KF67M with metal on back (steel)	Read	0 to 25.0 mm (Axis offset: ±10)
		Write	0 to 25.0 mm (Axis offset: ±10)
V680-HS65	V680-D8KF67M with metal on back (steel)	Read	0 to 25.0 mm (Axis offset: ±10)
		Write	0 to 25.0 mm (Axis offset: ±10)

▪ Measurement Conditions



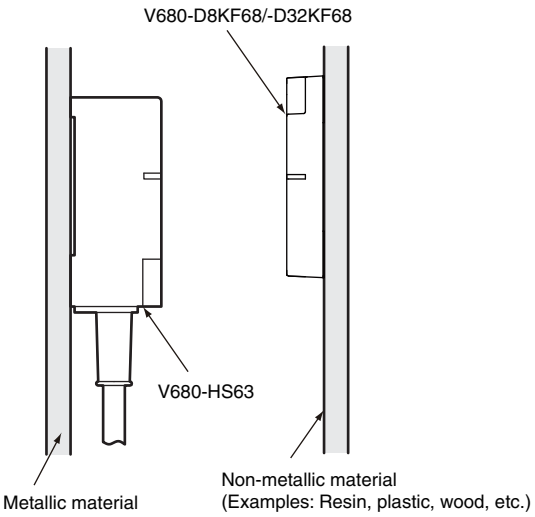


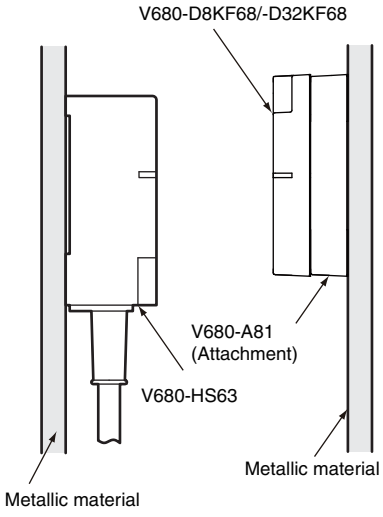


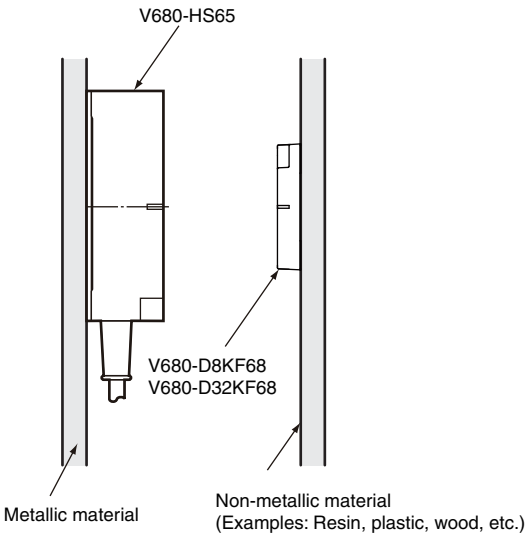
■ V680-D8KF68/-D32KF68

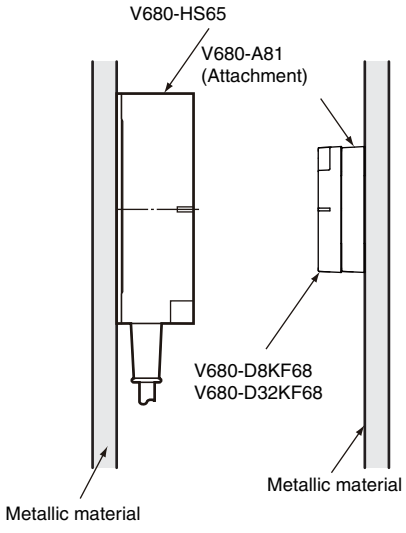
Antenna	RF Tag	Communications distance	
V680-HS63	V680-D8KF68	Read	5.0 to 45.0 mm (Axis offset: ±10)
		Write	5.0 to 45.0 mm (Axis offset: ±10)
	V680-D8KF68 (with V680-A81 Attachment, V680-A81) with metal on back (steel)	Read	5.0 to 35.0 mm (Axis offset: ±10)
		Write	5.0 to 35.0 mm (Axis offset: ±10)
	V680-D32KF68	Read	5.0 to 45.0 mm (Axis offset: ±10)
		Write	5.0 to 45.0 mm (Axis offset: ±10)
	V680-D32KF68 (with Attachment, V680-A81) with metal on back (steel)	Read	5.0 to 35.0 mm (Axis offset: ±10)
		Write	5.0 to 35.0 mm (Axis offset: ±10)
V680-HS65	V680-D8KF68	Read	5.0 to 75.0 mm (Axis offset: ±10)
		Write	5.0 to 75.0 mm (Axis offset: ±10)
	V680-D8KF68 (with Attachment, V680-A81) with metal on back (steel)	Read	5.0 to 55.0 mm (Axis offset: ±10)
		Write	5.0 to 55.0 mm (Axis offset: ±10)
	V680-D32KF68	Read	5.0 to 75.0 mm (Axis offset: ±10)
		Write	5.0 to 75.0 mm (Axis offset: ±10)
	V680-D32KF68 (with Attachment, V680-A81) with metal on back (steel)	Read	5.0 to 55.0 mm (Axis offset: ±10)
		Write	5.0 to 55.0 mm (Axis offset: ±10)

▪ Measurement Conditions









Communications Area

■ V680-D1KP52MT

CHECK!

The communications areas given here are for reference only. For information on communications distances, refer to *Communications Distance Specifications* in this section. The communications area depends on the type of RF Tags used, the ambient temperature, surrounding metals, and noise. Be sure to check carefully when installing the system.

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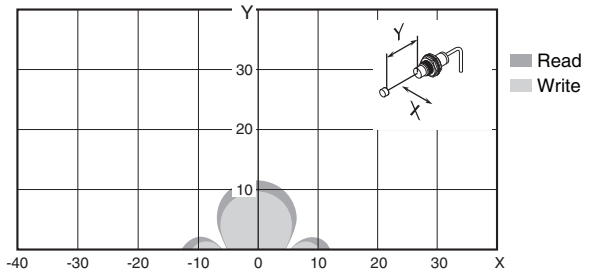
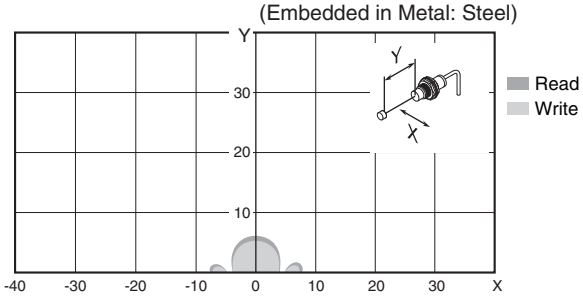
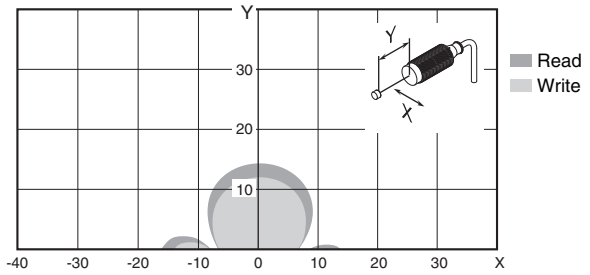
● V680-HS51 (Embedded in Metal) and V680-D1KP52MT



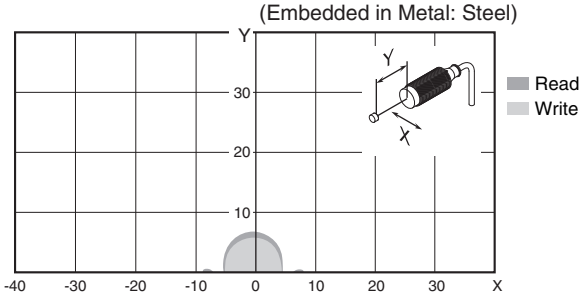
● V680-HS51 (Embedded in Metal) and V680-D1KP52MT (Embedded in Metal: Steel)



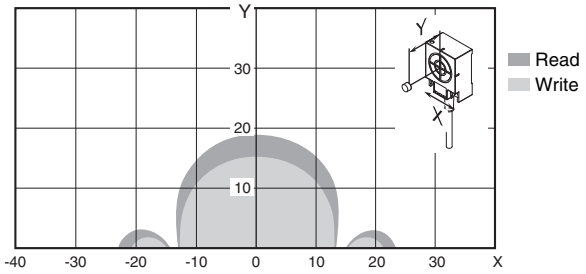
● V680-HS52 (Embedded in Non-Metal) and V680-D1KP52MT



● V680-HS52 (Embedded in Non-Metal) and V680-D1KP52MT (Embedded in Metal: Steel)



● V680-HS63 (with Non-Metal on Back Surface) and V680-D1KP52MT



■ V680-D1KP52M-BT01/-D1KP52M-BT11

CHECK!

The communications areas given here are for reference only. For information on communications distances, refer to *Communications Distance Specifications* in this section. The communications area depends on the type of RF Tags used, the ambient temperature, surrounding metals, and noise. Be sure to check carefully when installing the system.

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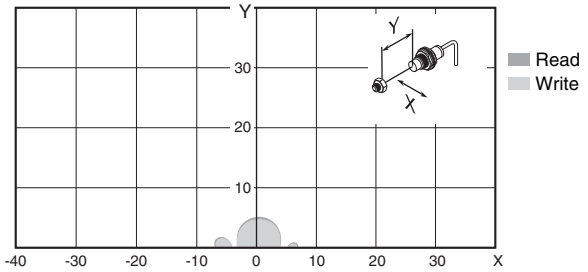
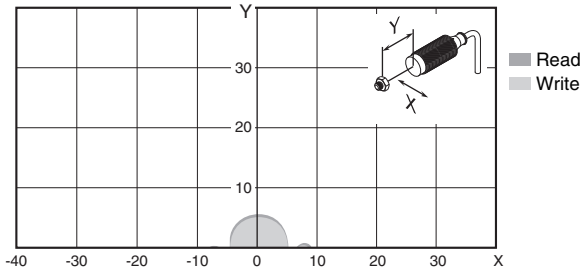
●V680-HS51（Embedded in Metal）
and V680-D1KP52M-BT01/-D1KP52M-BT11



●V680-HS52（Embedded in Non-Metal）
and V680-D1KP52M-BT01/-D1KP52M-BT11



■ V680-D1KP53M

CHECK!

The communications areas given here are for reference only. For information on communications distances, refer to *Communications Distance Specifications* in this section. The communications area depends on the type of RF Tags used, the ambient temperature, surrounding metals, and noise. Be sure to check carefully when installing the system.

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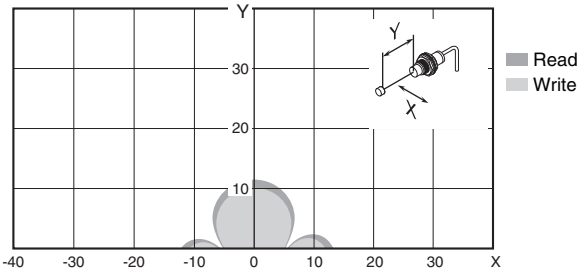
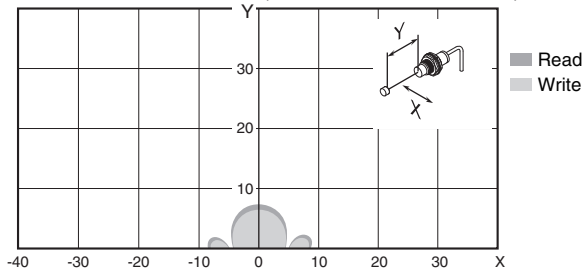
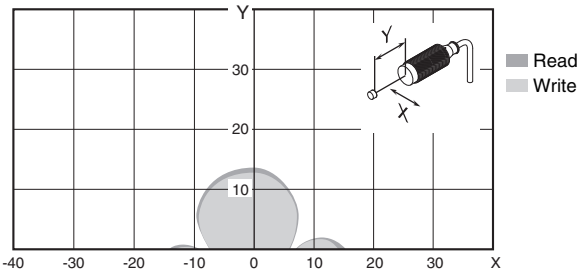
● V680-HS51（Embedded in Metal） and V680-D1KP53M



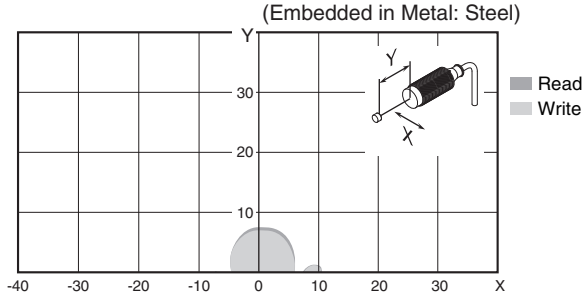
● V680-HS51（Embedded in Metal） and V680-D1KP53M
(Embedded in Metal: Steel)



● V680-HS52（Embedded in Non-Metal） and V680-D1KP53M



● V680-HS52（Embedded in Non-Metal） and V680-D1KP53M
(Embedded in Metal: Steel)



■ V680-D1KP66T

CHECK!

The communications areas given here are for reference only. For information on communications distances, refer to *Communications Distance Specifications* in this section. The communications area depends on the type of RF Tags used, the ambient temperature, surrounding metals, and noise. Be sure to check carefully when installing the system.

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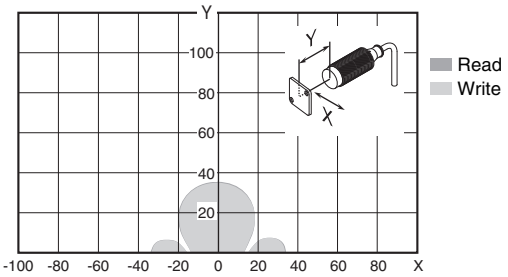
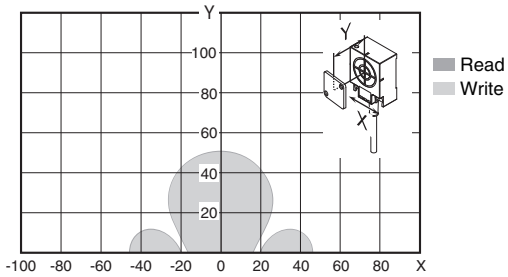
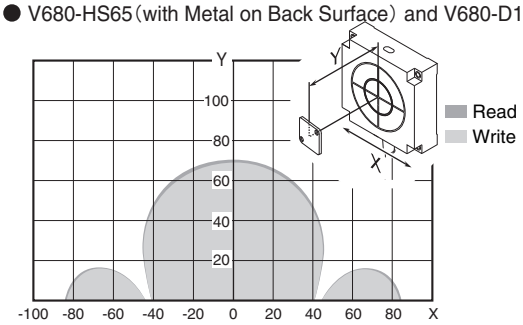
● V680-HS52（Embedded in Non-Metal） and V680-D1KP66T



● V680-HS63（with Non-Metal on Back Surface） and V680-D1KP66T



● V680-HS65（with Metal on Back Surface） and V680-D1KP66T



■ V680-D1KP66MT

CHECK!

The communications areas given here are for reference only. For information on communications distances, refer to *Communications Distance Specifications* in this section. The communications area depends on the type of RF Tags used, the ambient temperature, surrounding metals, and noise. Be sure to check carefully when installing the system.

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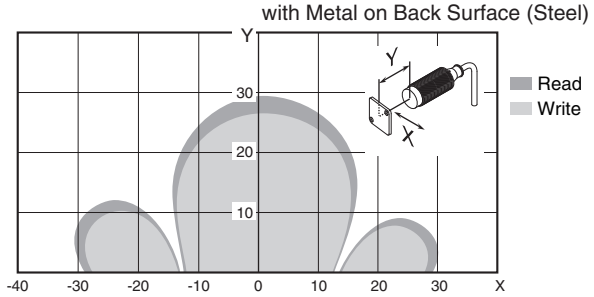
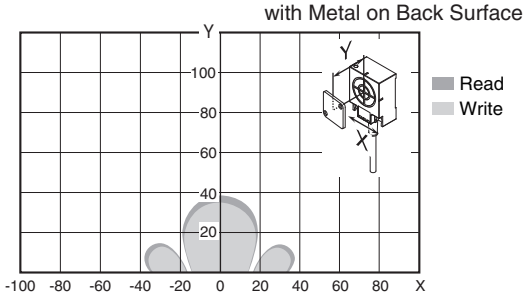
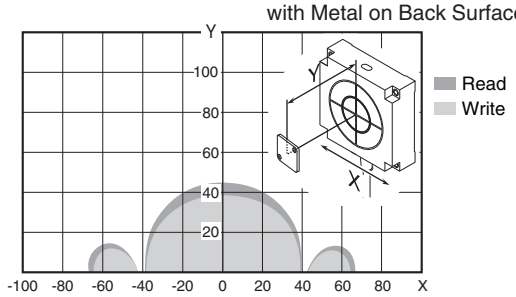
● V680-HS52（Embedded in Non-Metal） and V680-D1KP66MT with Metal on Back Surface (Steel)



● V680-HS63（with Non-Metal on Back Surface） and V680-D1KP66MT with Metal on Back Surface (Steel)



● V680-HS65（with Metal on Back Surface） and V680-D1KP66MT with Metal on Back Surface (Steel)



■ V680-D1KP66T-SP

CHECK!

The communications areas given here are for reference only. For information on communications distances, refer to *Communications Distance Specifications* in this section. The communications area depends on the type of RF Tags used, the ambient temperature, surrounding metals, and noise. Be sure to check carefully when installing the system.

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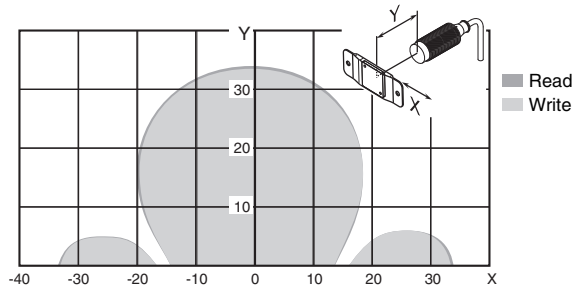
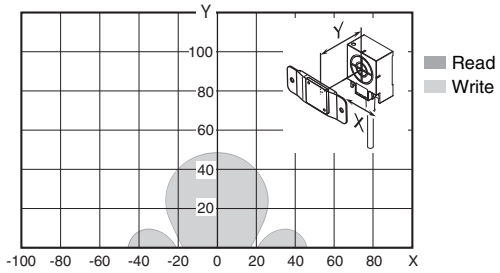
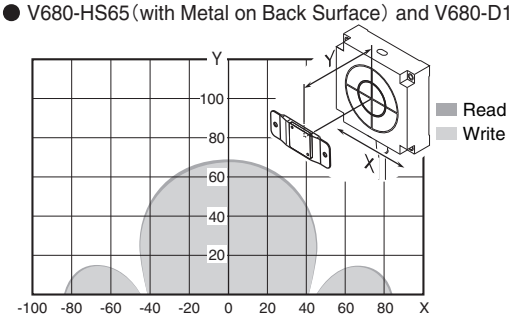
● V680-HS52（Embedded in Non-Metal） and V680-D1KP66T-SP



● V680-HS63（with Non-Metal on Back Surface） and V680-D1KP66T-SP



● V680-HS65（with Metal on Back Surface） and V680-D1KP66T-SP



■ V680-D2KF52M

CHECK!

The communications areas given here are for reference only. For information on communications distances, refer to *Communications Distance Specifications* in this section. The communications area depends on the type of RF Tags used, the ambient temperature, surrounding metals, and noise. Be sure to check carefully when installing the system.

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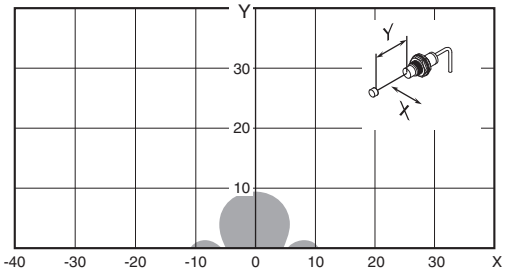
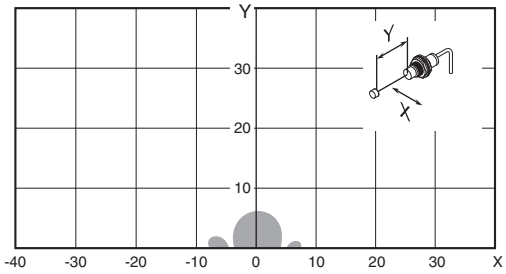
● V680-HS51（Embedded in Metal） and V680-D2KF52M

・Read/Write



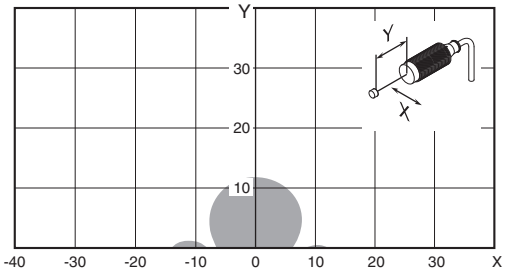
● V680-HS51（Embedded in Metal） and V680-D2KF52M
(Embedded in Metal: Steel)

・Read/Write



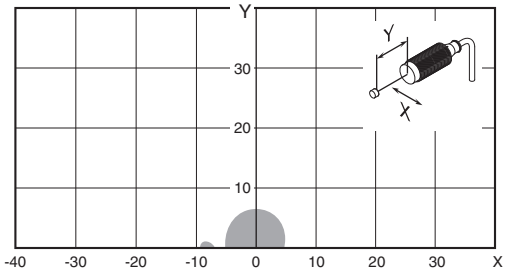
● V680-HS52（Embedded in Non-Metal） and V680-D2KF52M

・Read/Write



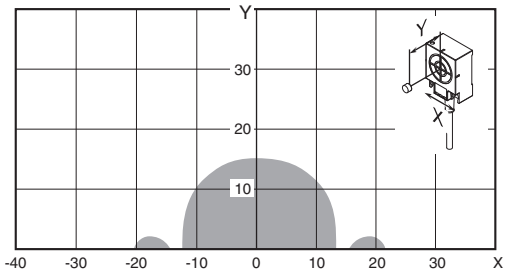
● V680-HS52（Embedded in Non-Metal） and V680-D2KF52M
(Embedded in Metal: Steel)

・Read/Write



● V680-HS63（with Non-Metal on Back Surface） and V680-D2KF52M

・Read/Write



■ V680-D2KF52M-BT01/-D2KF52M-BT11

CHECK!

The communications areas given here are for reference only. For information on communications distances, refer to *Communications Distance Specifications* in this section. The communications area depends on the type of RF Tags used, the ambient temperature, surrounding metals, and noise. Be sure to check carefully when installing the system.

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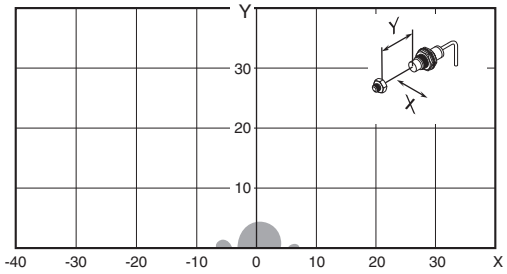
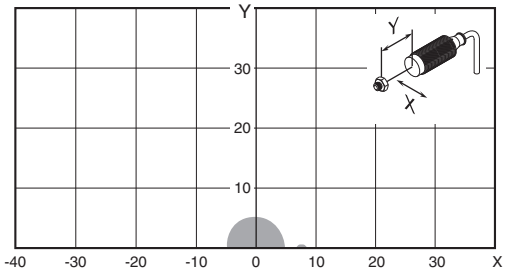
●V680-HS51（Embedded in Metal）
and V680-D2KF52M-BT01/-D2KF52M-BT11

・Read/Write



●V680-HS52（Embedded in Non-Metal）
and V680-D2KF52M-BT01/-D2KF52M-BT11

・Read/Write



■ V680-D2KF67

CHECK!

The communications areas given here are for reference only. For information on communications distances, refer to *Communications Distance Specifications* in this section. The communications area depends on the type of RF Tags used, the ambient temperature, surrounding metals, and noise. Be sure to check carefully when installing the system.

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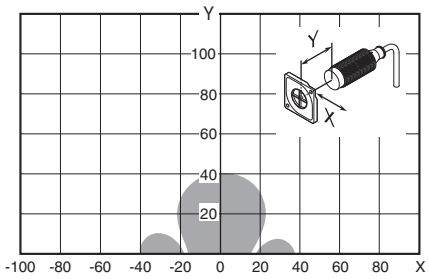
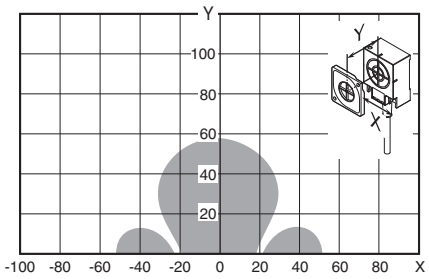
● V680-HS52（Embedded in Non-Metal） and V680-D2KF67

・Read/Write



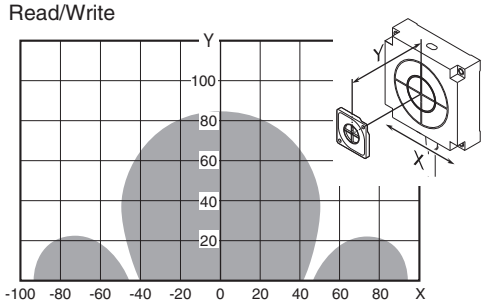
● V680-HS63（with Non-Metal on Back Surface） and V680-D2KF67

・Read/Write



● V680-HS65（with Metal on Back Surface） and V680-D2KF67

・Read/Write



■ V680-D2KF67M

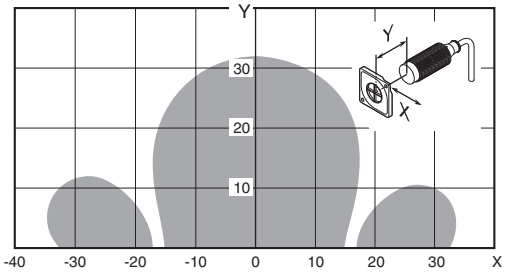
CHECK!

The communications areas given here are for reference only. For information on communications distances, refer to *Communications Distance Specifications* in this section. The communications area depends on the type of RF Tags used, the ambient temperature, surrounding metals, and noise. Be sure to check carefully when installing the system.

p.99

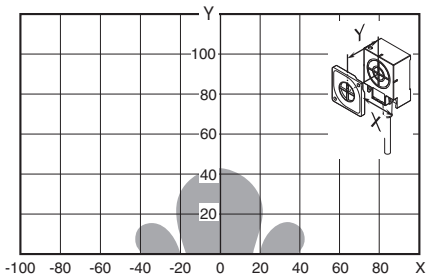
● V680-HS52（Embedded in Non-Metal） and V680-D2KF67M with Metal on Back Surface (Steel)

・Read/Write



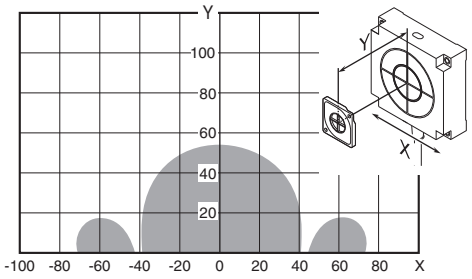
● V680-HS63（with Non-Metal on Back Surface） and V680-D2KF67M with Metal on Back Surface (Steel)

・Read/Write



● V680-HS65（with Metal on Back Surface） and V680-D2KF67M with Metal on Back Surface (Steel)

・Read/Write



■ V680-D8KF67

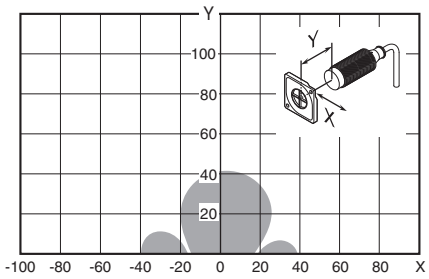
CHECK!

The communications areas given here are for reference only. For information on communications distances, refer to *Communications Distance Specifications* in this section. The communications area depends on the type of RF Tags used, the ambient temperature, surrounding metals, and noise. Be sure to check carefully when installing the system.

p.99

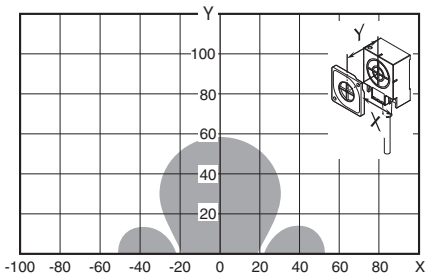
● V680-HS52（Embedded in Non-Metal） and V680-D8KF67

・Read/Write



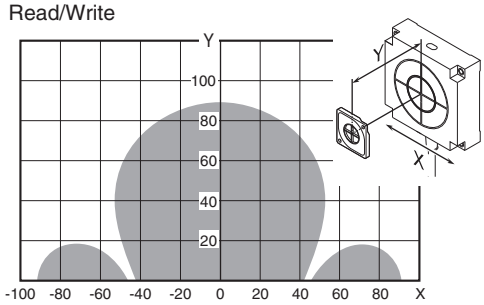
● V680-HS63（with Non-Metal on Back Surface） and V680-D8KF67

・Read/Write



● V680-HS65（with Metal on Back Surface） and V680-D8KF67

・Read/Write



■ V680-D8KF67M

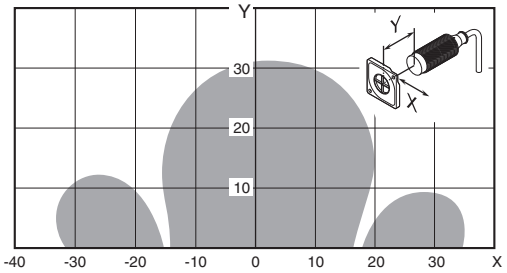
CHECK!

The communications areas given here are for reference only. For information on communications distances, refer to *Communications Distance Specifications* in this section. The communications area depends on the type of RF Tags used, the ambient temperature, surrounding metals, and noise. Be sure to check carefully when installing the system.

p.99

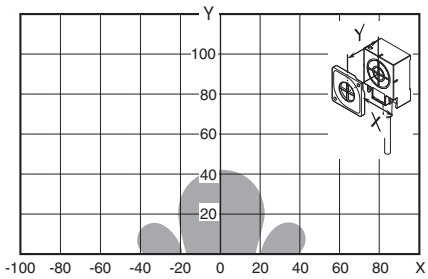
● V680-HS52（Embedded in Non-Metal） and V680-D8KF67M with Metal on Back Surface (Steel)

・Read/Write



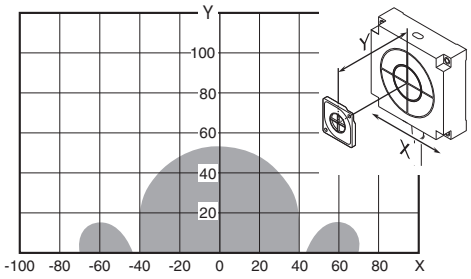
● V680-HS63（with Non-Metal on Back Surface） and V680-D8KF67M with Metal on Back Surface (Steel)

・Read/Write



● V680-HS65（with Metal on Back Surface） and V680-D8KF67M with Metal on Back Surface (Steel)

・Read/Write



■ V680-D8KF68/-D32KF68

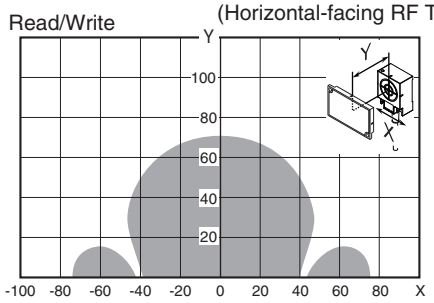
CHECK!

The communications areas given here are for reference only. For information on communications distances, refer to *Communications Distance Specifications* in this section. The communications area depends on the type of RF Tags used, the ambient temperature, surrounding metals, and noise. Be sure to check carefully when installing the system.

p.99

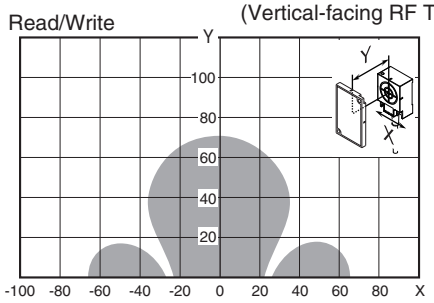
● V680-HS63 (with Metal on Back Surface) and V680-D8KF68/-D32KF68 (Horizontal-facing RF Tag)

・Read/Write



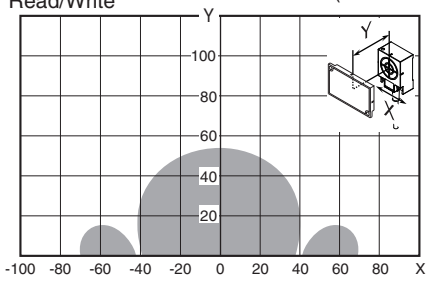
● V680-HS63 (with Metal on Back Surface) and V680-D8KF68/-D32KF68 (Vertical-facing RF Tag)

・Read/Write



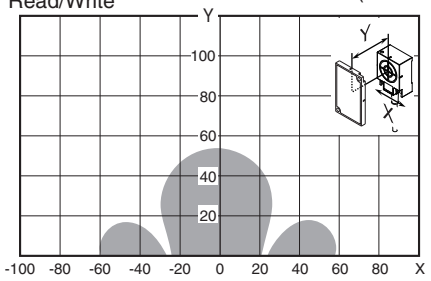
● V680-HS63 (with Metal on Back Surface) and V680-D8KF68/-D32KF68 (with Attachment, V680-A81) Metal on back: Steel (Horizontal-facing RF Tag)

・Read/Write



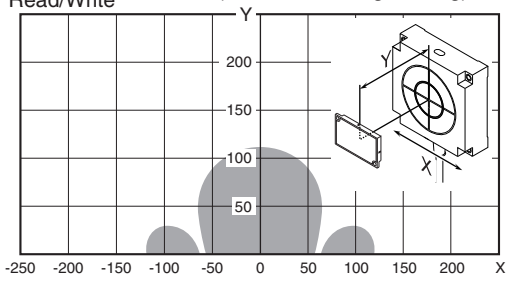
● V680-HS63 (with Metal on Back Surface) and V680-D8KF68/-D32KF68 (with Attachment, V680-A81) Metal on back: Steel (Vertical-facing RF Tag)

・Read/Write



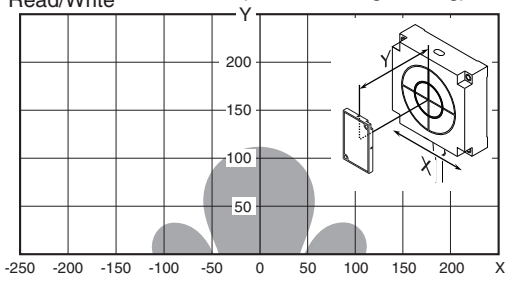
● V680-HS65 (with Metal on Back Surface) and V680-D8KF68/-D32KF68 (Horizontal-facing RF Tag)

・Read/Write



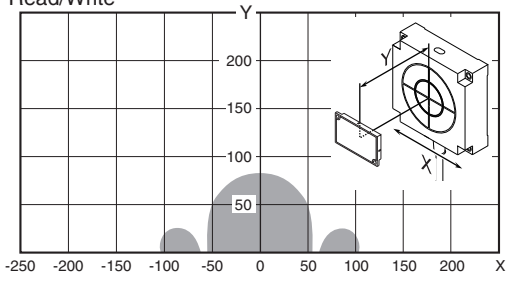
● V680-HS65 (with Metal on Back Surface) and V680-D8KF68/-D32KF68 (Vertical-facing RF Tag)

・Read/Write



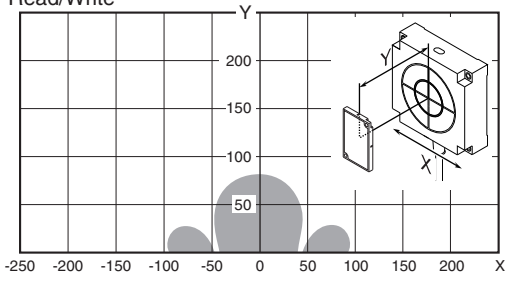
● V680-HS65 (with Metal on Back Surface) and V680-D8KF68/-D32KF68 (with Attachment, V680-A81) Metal on back: Steel (Horizontal-facing RF Tag)

・Read/Write



● V680-HS65 (with Metal on Back Surface) and V680-D8KF68/-D32KF68 (with Attachment, V680-A81) Metal on back: Steel (Vertical-facing RF Tag)

・Read/Write



Communications Time (Reference)

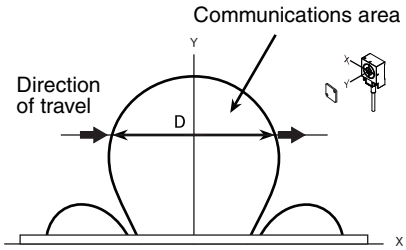
Communication time is defined as a time between the ID Flag Sensor starts the communication operation(at the time when the RF Tag comes in the communication area) and outputs the NORMAL/ STRB output signal.

■ Communications Time (Reference)

Operation / RF Tag	Read	Write
	DATA READ MODE VERIFY READ MODE	2bytes Write 1bytes Write Bit Set Bit Clear
V680-D1KP□□ V680-D2KF□□	43 ms	87 ms
V680-D8KF□□ V680-D32KF68	50 ms	84 ms

■ Calculating RF Tag Speed : Auto Mode

When communicating with a moving RF Tag, specify an AUTO MODE. The maximum speed for communicating with the RF Tag can be calculated simply using following formula.

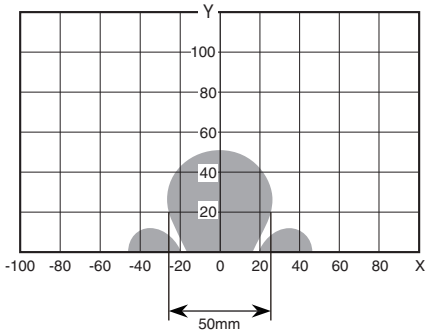


$$\text{RF Tag Speed (m/min)} \quad \frac{\text{D (Distance travelled in communications area)}}{\text{T (Communications time)}}$$

D(Distance travelled in communications area) is calculated from the actual measurement or the communications area between the Antenna and RF Tag.

▪ Calculation Example

In this example, reading the V680-D1KP66T RF Tag with the V680-HS63 Antenna are used.



$$\text{RF Tag Speed (m/min)} \quad \frac{50\ (\text{mm})}{43\ (\text{ms})} \approx 69\ (\text{m/min})$$

Note1: The distance travelled in the communications area depends on the read/write distance and the axis offset. Refer to the diagrams in Communications area.

2: The maximum speed calculated here is a guideline. Always test actual performance in advance.

3: Error processing for communications with the host device and RF Tag communications is not considered in the above calculations.

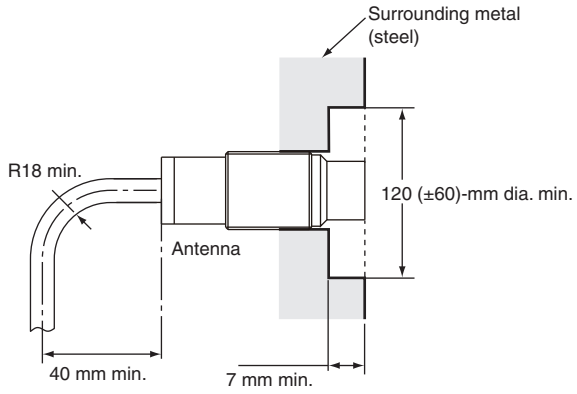
Reference Data: Antenna and RF Tags Installation

Antenna Mounting Precautions

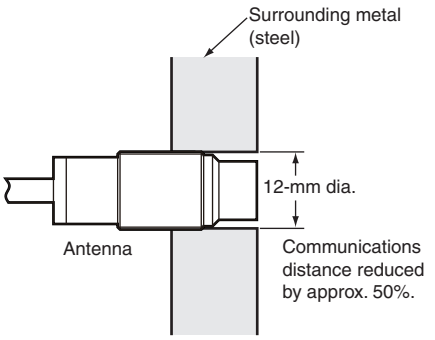
■ V680-HS51

▪ Effect of Surrounding Metals on the Antenna (Reference)

When embedding the Antenna in metal, be sure the metal does not extend beyond the tip of the Antenna.



Do not bend the cable into a curve tighter than 18 mm in radius.

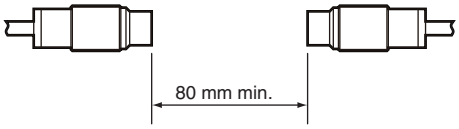


If the metal around the Antenna reaches the communication surface, the communications distance will be reduced by approx. 50% compared with mounting to a non-metallic surface.

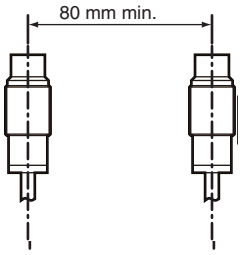
▪ Mutual Interference between Antennas (Reference)

To prevent malfunctioning due to mutual interference when using more than one Antenna, leave sufficient space between them as shown in the following diagrams.

- Installing the Antennas Facing Each Other



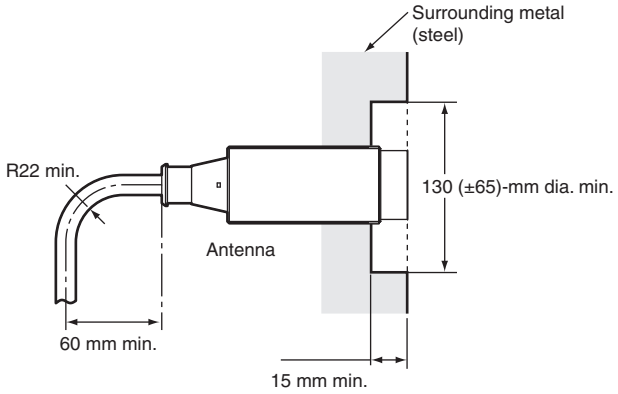
- Installing the Antennas in Parallel



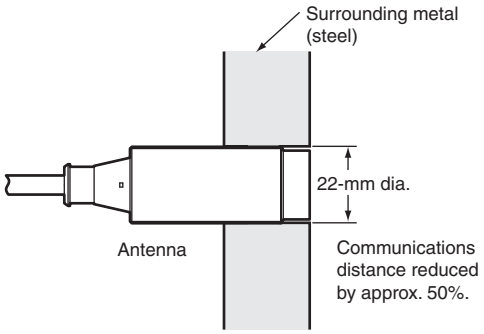
■ V680-HS52

▪ Effect of Surrounding Metals on the Antenna (Reference)

When embedding the Antenna in metal, be sure the metal does not extend beyond the tip of the Antenna.



Do not bend the cable into a curve tighter than 22 mm in radius.

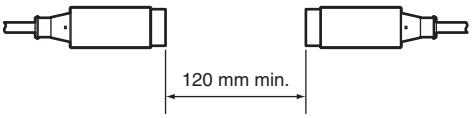


If the metal around the Antenna reaches the coil surface, the communications distance will be reduced by approx. 50% compared with mounting to a non-metallic surface.

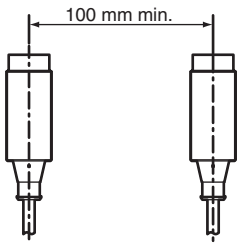
▪ Mutual Interference between Antennas (Reference)

To prevent malfunctioning due to mutual interference when using more than one Antenna, leave sufficient space between them as shown in the following diagrams.

- Installing the Antennas Facing Each Other



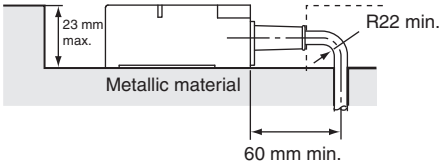
- Installing the Antennas in Parallel

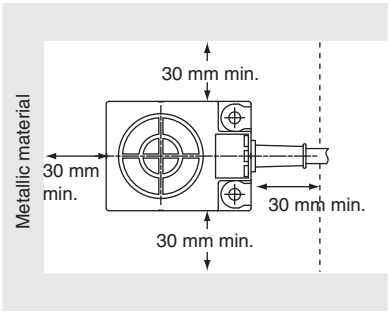


■ V680-HS63

▪ Effect of Surrounding Metals on the Antenna (Reference)

In addition to surface mounting, it is also possible to embed the V680-HS63 in a metallic material to protect it from being struck by other objects. To prevent malfunctioning, allow a space of at least 30 mm between the Antenna and the sides of the metallic material. If the space is less than 30 mm, the read/write distance will be greatly diminished. In addition, the height of metallic material must not exceed that of the Antenna.



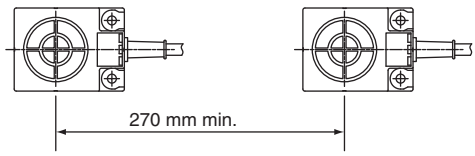


Note 1: Do not bend the cable into a curve tighter than 22 mm in radius.
2: The communications distance will be reduced significantly if the Antenna is installed closer than 30 mm to metal surfaces.

▪ Mutual Interference between Antennas (Reference)

To prevent malfunctioning due to mutual interference when using more than one Antenna, leave sufficient space between them as shown in the following diagrams.

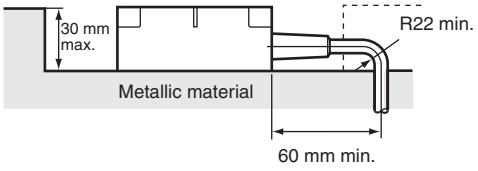
- Installing the Antennas Facing Each Other
- Installing the Antennas in Parallel

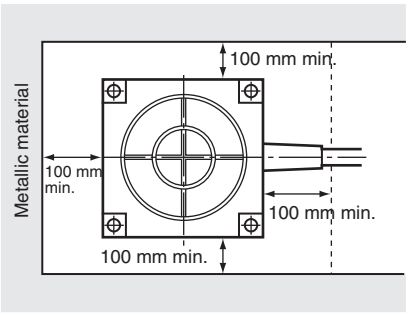


■ V680-HS65

▪ Effect of Surrounding Metals on the Antenna (Reference)

In addition to surface mounting, it is also possible to embed the V680-HS65 in a metallic material to protect it from being struck by other objects. To prevent malfunctioning, allow a space of at least 100 mm between the Antenna and the sides of the metallic material. If the space is less than 100 mm, the read/write distance will be greatly diminished. In addition, the height of metallic material must not exceed that of the Antenna.



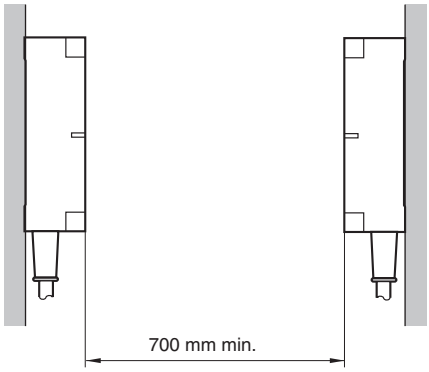


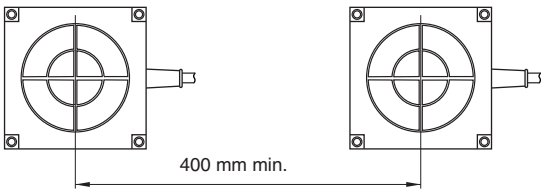
Note 1: Do not bend the cable into a curve tighter than 22 mm in radius.
2: The communications distance will be reduced significantly if the Antenna is installed closer than 100 mm to metal surfaces.

▪ Mutual Interference between Antennas (Reference)

To prevent malfunctioning due to mutual interference when using more than one Antenna, leave sufficient space between them as shown in the following diagrams.

- Installing the Antennas Facing Each Other
- Installing the Antennas in Parallel





RF Tag Mounting Precautions

■ V680-D1KP52MT

▪ Differences in Surrounding Metals(Reference)

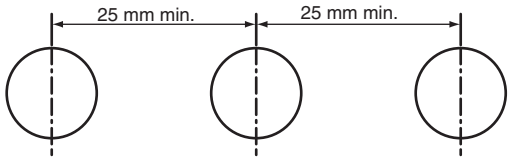
Communications distances are affected by the type of metal in back of or surrounding the RF Tag, as shown in the following table.

	Steel	SUS	Brass	Aluminum
V680-D1KP52M	100%	85% to 90%	80% to 85%	80% to 85%

Note: The value for steel around or behind the RF Tag is set to 100%.

▪ Mutual Interference with RF Tags (Reference)

To prevent malfunctioning due to mutual interference when using more than one RF Tag, leave sufficient space between them as shown in the following diagram.



▪ Influence of RF Tag Angle (Reference)

Install Antennas and RF Tags as parallel to each other as possible.

Communications are possible even when an Antenna and an RF Tag are mounted at an angle, but the communications distance will be shortened. The relation between the angle and the communications distance is shown below.

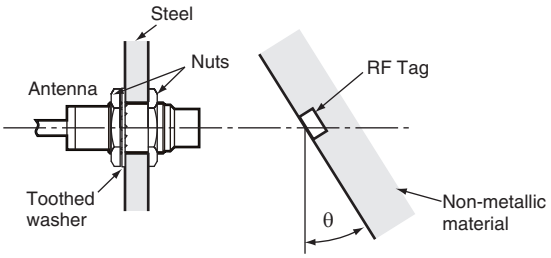
Percentage of Change in Communications Distance for 680-D1KP52MT Angle

	RF Tag angle (θ°)				
	0	10	20	30	40
V680-HS51 and V680-D1KP52MT	0%	−1%	−5%	−10%	−15%
V680-HS51 and V680-D1KP52MT (Metal on back: Steel)	0%	0%	0%	−4%	−28%
V680-HS52 and V680-D1KP52MT	0%	0%	0%	−2%	−6%
V680-HS52 and V680-D1KP52MT (Metal on back: Steel)	0%	−6%	−13%	−25%	---
V680-HS63 and V680-D1KP52MT	0%	−2%	−5%	−9%	−14%

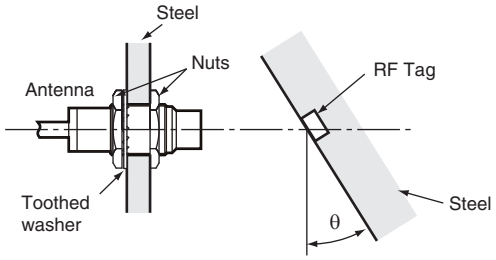
---: Measurement is not possible because Antenna and RF Tag would strike each other.

Measurement Conditions

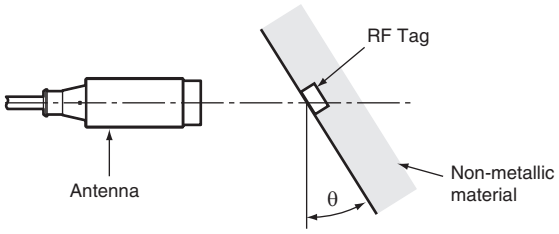
- V680-HS51 and V680-D1KP52MT



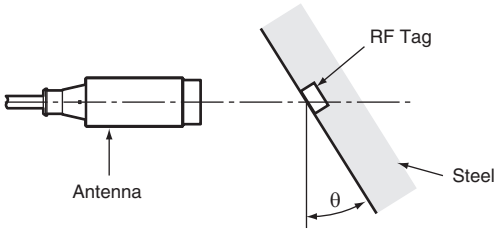
- V680-HS51 and V680-D1KP52MT (Metal on back: Steel)



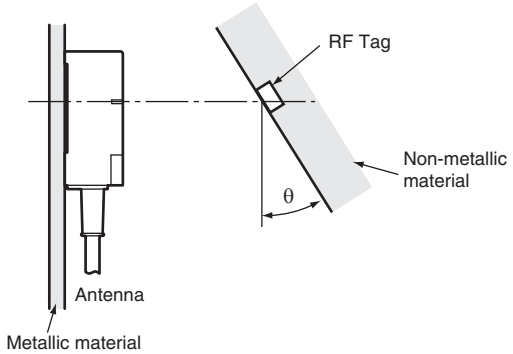
- V680-HS52 and V680-D1KP52MT



- V680-HS52 and V680-D1KP52MT (Metal on back: Steel)



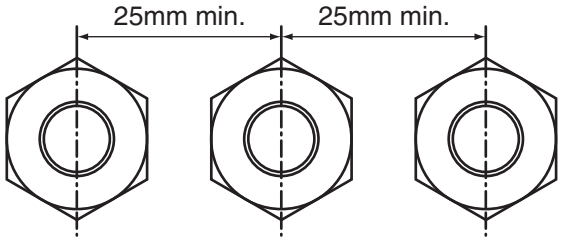
- V680-HS63 and V680-D1KP52MT



■ V680-D1KP52M-BT01/-D1KP52M-BT11

▪ Mutual Interference with RF Tags (Reference)

To prevent malfunctioning due to mutual interference when using more than one RF Tag, leave sufficient space between them as shown in the following diagram.



▪ Influence of RF Tag Angle (Reference)

Install Antennas and RF Tags as parallel to each other as possible.

Communications are possible even when an Antenna and an RF Tag are mounted at an angle, but the communications distance will be shortened. The relation between the angle and the communications distance is shown below.

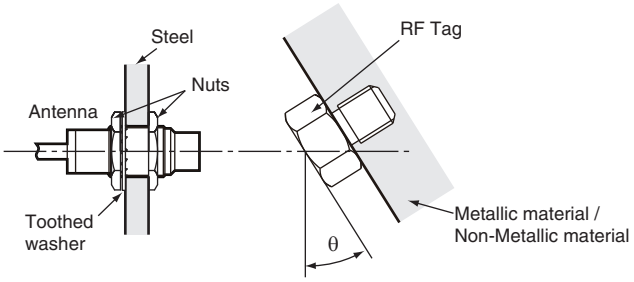
Percentage of Change in Communications Distance for 680-D1KP52M-BT01/-D1KP52M-BT11 Angle

	RF Tag angle (θ°)				
	0	10	20	30	40
V680-HS51 and V680-D1KP52M-BT01/-D1KP52M-BT11	0%	−18%	−36%	---	---
V680-HS52 and V680-D1KP52M-BT01/-D1KP52M-BT11	0%	−34%	−50%	---	---

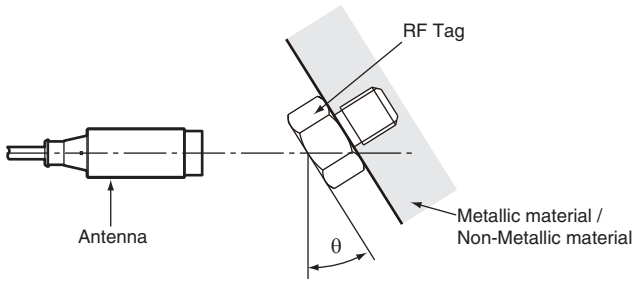
---: Measurement is not possible because Antenna and RF Tag would strike each other.

Measurement Conditions

● V680-HS51
and V680-D1KP52M-BT01/-D1KP52M-BT11



● V680-HS52
and V680-D1KP52M-BT01/-D1KP52M-BT11



■ V680-D1KP53M

▪ Differences in Surrounding Metals(Reference)

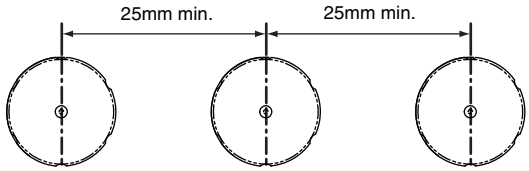
Communications distances are affected by the type of metal in back of or surrounding the RF Tag, as shown in the following table.

	Steel	SUS	Brass	Aluminum
V680-D1KP53M	100%	90% to 95%	90% to 95%	90% to 95%

Note: The value for steel around or behind the RF Tag is set to 100%.

▪ Mutual Interference with RF Tags (Reference)

To prevent malfunctioning due to mutual interference when using more than one RF Tag, leave sufficient space between them as shown in the following diagram.



▪ Influence of RF Tag Angle (Reference)

Install Antennas and RF Tags as parallel to each other as possible.

Communications are possible even when an Antenna and an RF Tag are mounted at an angle, but the communications distance will be shortened. The relation between the angle and the communications distance is shown below.

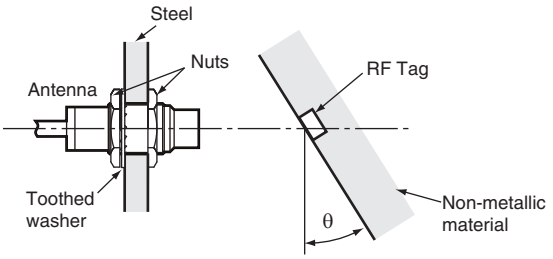
Percentage of Change in Communications Distance for 680-D1KP53M Angle

	RF Tag angle (θ°)				
	0	10	20	30	40
V680-HS51 and V680-D1KP53M	0%	−1%	−5%	−10%	−15%
V680-HS51 and V680-D1KP53M (Metal on back: Steel)	0%	0%	0%	−4%	−28%
V680-HS52 and V680-D1KP53M	0%	0%	0%	−2%	−6%
V680-HS52 and V680-D1KP53M (Metal on back: Steel)	0%	−6%	−13%	−25%	---

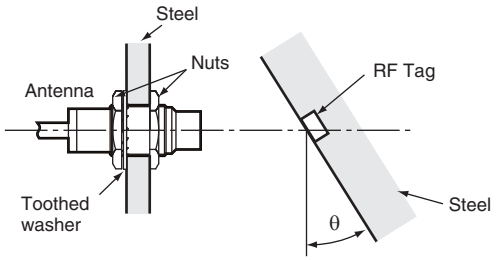
---: Measurement is not possible because Antenna and RF Tag would strike each other.

Measurement Conditions

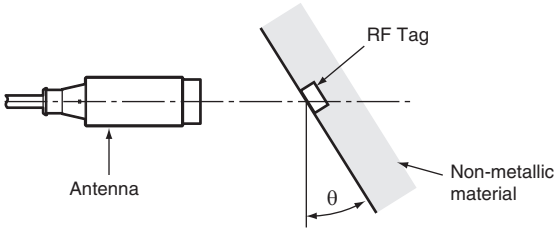
● V680-HS51 and V680-D1KP53M



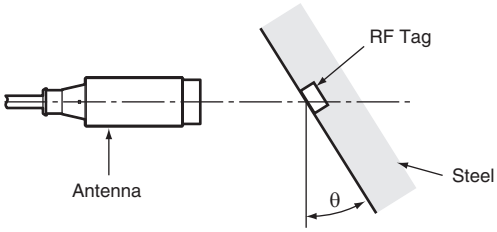
● V680-HS51 and V680-D1KP53M
(Metal on back: Steel)



● V680-HS52 and V680-D1KP53M



● V680-HS52 and V680-D1KP53M
(Metal on back: Steel)



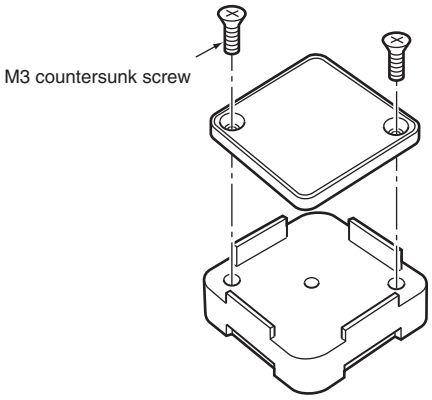
■ V680-D1KP66T

▪ Effect of Metal on Back of RF Tags (Reference)

The V680-D1KP66T communications distance is reduced if there is any metal on the back of the RF Tag.

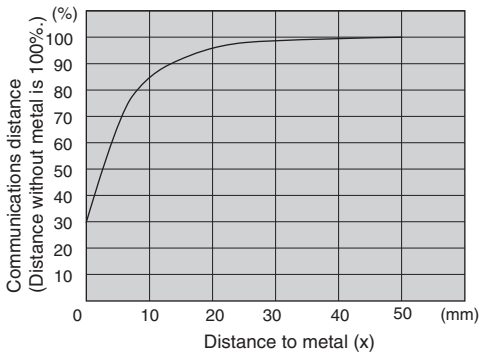
If the RF Tag is to be mounted to metallic material, then either use a V600-A86 Attachment (sold separately) or insert a non-metal spacer (such as plastic or resin). The relationship between the distance from the RF Tag to the metal surface and the communications distance is shown below. The Attachment is 10 mm thick, and more than one Attachment can be stacked.

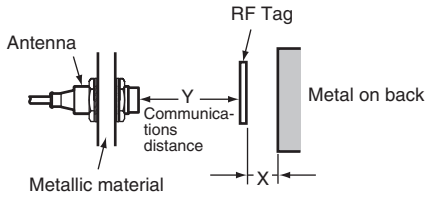
V600-A86 Attachment Installation



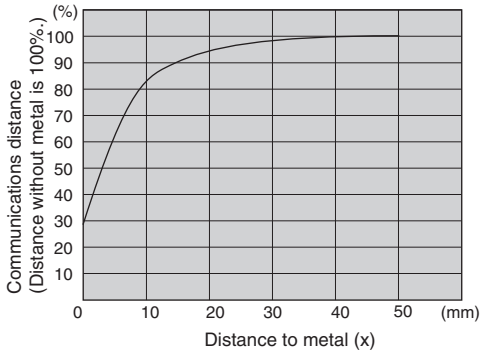
Note: Install so that the mounting holes are aligned.

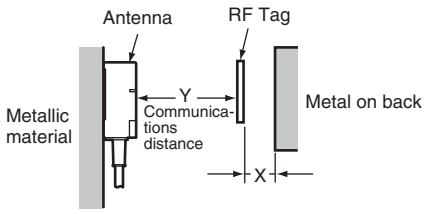
● V680-HS52 and V680-D1KP66T



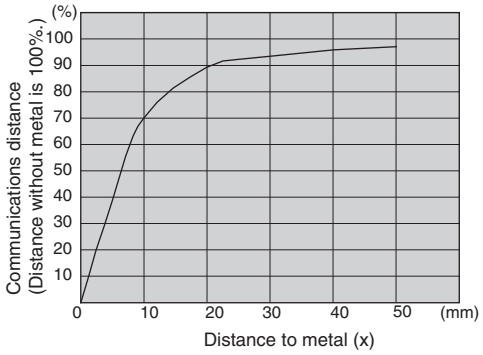


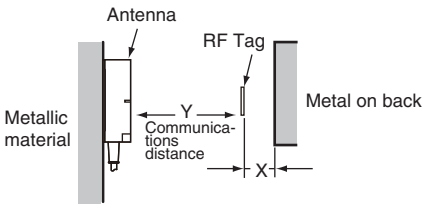
● V680-HS63 and V680-D1KP66T





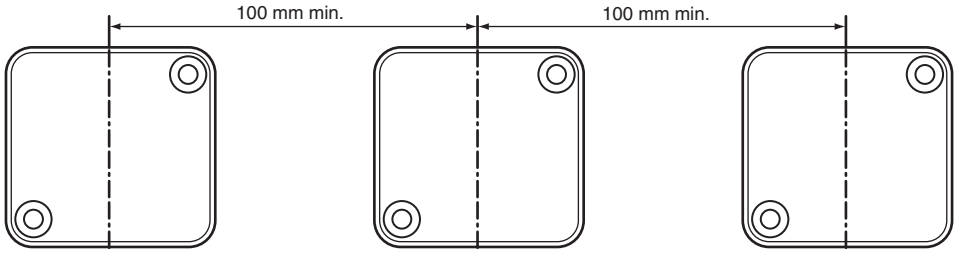
● V680-HS65 and V680-D1KP66T





▪ Mutual Interference with RF Tags (Reference)

To prevent malfunctioning due to mutual interference when using more than one RF Tag, leave sufficient space between them as shown in the following diagram.



▪ Influence of RF Tag Angle (Reference)

Install Antennas and RF Tags as parallel to each other as possible.

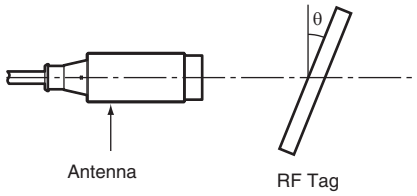
Communications are possible even when an Antenna and an RF Tag are mounted at an angle, but the communications distance will be shortened. The relation between the angle and the communications distance is shown below.

Reduction in Communications Distance for V680-D1KP66T Angle

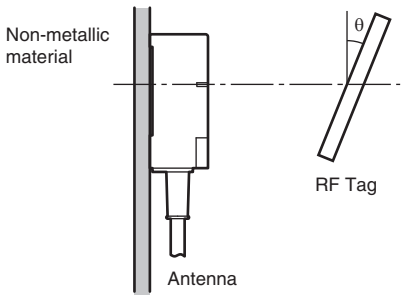
	RF Tag angle (θ°)				
	0	10	20	30	40
V680-HS52 and V680-D1KP66T	0%	–1%	–2%	–4%	–7%
V680-HS63 and V680-D1KP66T	0%	–2%	–3%	–5%	–9%
V680-HS65 and V680-D1KP66T	0%	–1%	–3%	–6%	–11%

Measurement Conditions

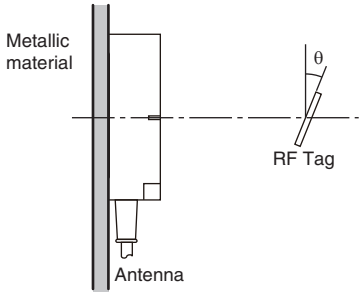
- V680-HS52 and V680-D1KP66T



- V680-HS63 and V680-D1KP66T



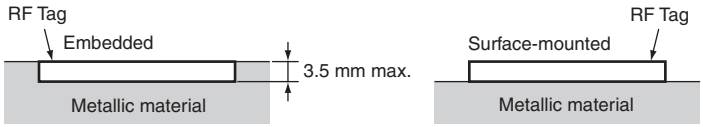
- V680-HS65 and V680-D1KP66T



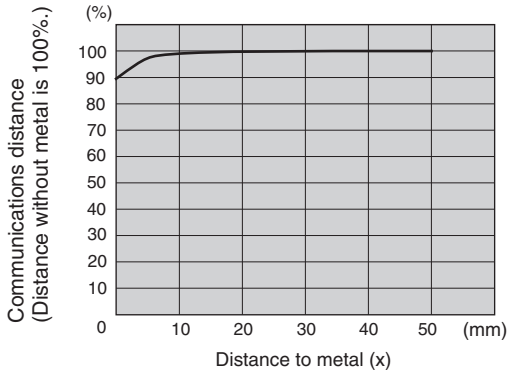
■ V680-D1KP66MT

▪ Effect of Surrounding Metals (Reference)

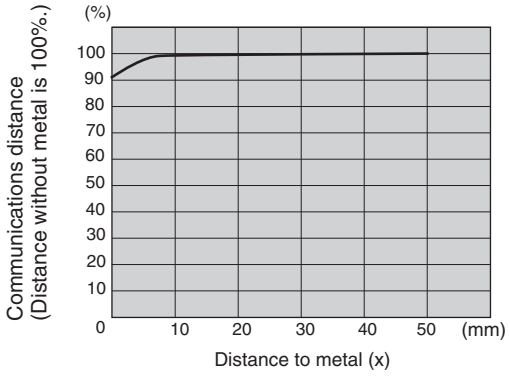
The V680-D1KP66MT can be surface-mounted or it can be embedded in metal. If it is embedded in metal, the height of the metal casing must not exceed that of the RF Tag.



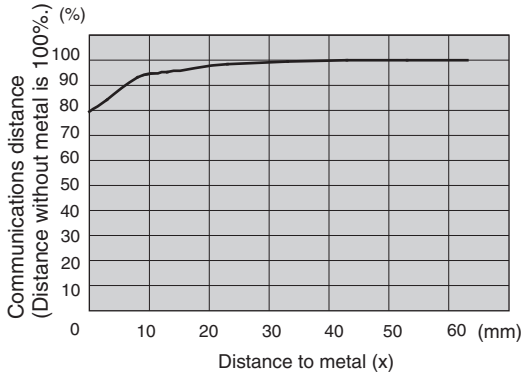
● V680-HS52 and V680-D1KP66MT

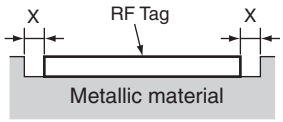


● V680-HS63 and V680-D1KP66MT



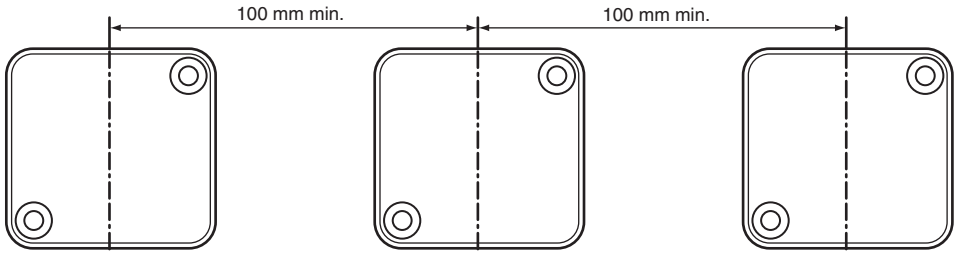
● V680-HS65 and V680-D1KP66MT





▪ Mutual Interference with RF Tags (Reference)

To prevent malfunctioning due to mutual interference when using more than one RF Tag, leave sufficient space between them as shown in the following diagram.



▪ Influence of RF Tag Angle (Reference)

Install Antennas and RF Tags as parallel to each other as possible.
Communications are possible even when an Antenna and an RF Tag are mounted at an angle, but the communications distance will be shortened. The relation between the angle and the communications distance is shown below.

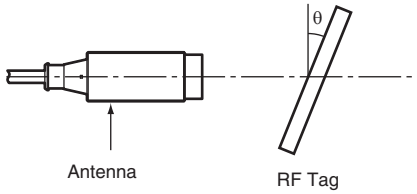
Reduction in Communications Distance for V680-D1KP66MT Angle

	RF Tag angle (θ°)				
	0	10	20	30	40
V680-HS52 and V680-D1KP66MT (Metal on back: Steel)	0%	−1%	−2%	−5%	−9%
V680-HS63 and V680-D1KP66MT (Metal on back: Steel)	0%	−1%	−4%	−7%	−13%
V680-HS65 and V680-D1KP66MT (Metal on back: Steel)	0%	−1%	−6%	−15%	---

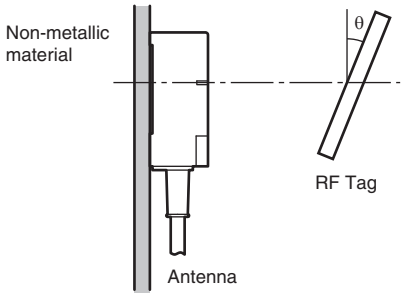
---: Measurement is not possible because Antenna and RF Tag would strike each other.

Measurement Conditions

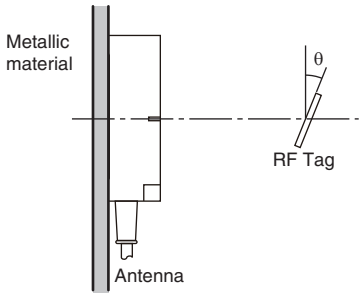
- V680-HS52 and V680-D1KP66MT (Metal on back: Steel)



- V680-HS63 and V680-D1KP66MT (Metal on back: Steel)



- V680-HS65 and V680-D1KP66MT (Metal on back: Steel)



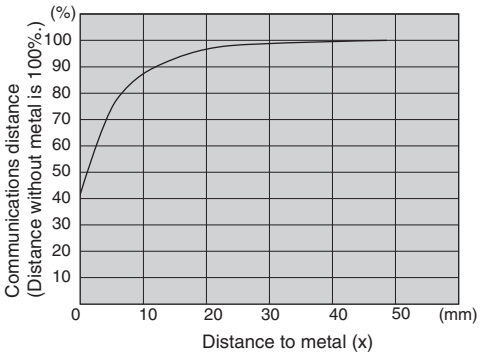
■ V680-D1KP66T-SP

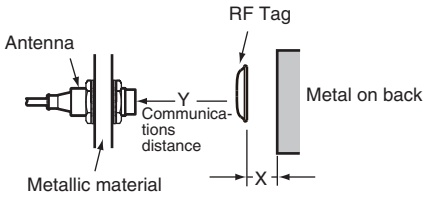
▪ Effect of Metal on Back of RF Tags (Reference)

The V680-D1KP66T-SP communications distance is reduced if there is any metallic material on the back of the RF Tag. If the RF Tag is mounted on metallic material, insert a non-metal spacer (such as plastic or resin).

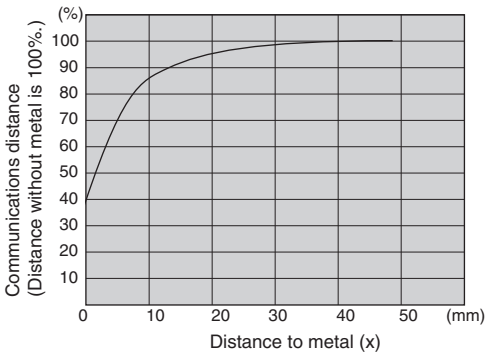
The relationship between the distance from the RF Tag to the metal surface and the communications distance is shown below.

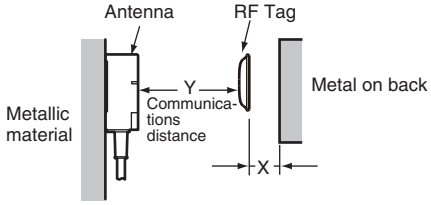
● V680-HS52 and V680-D1KP66T-SP



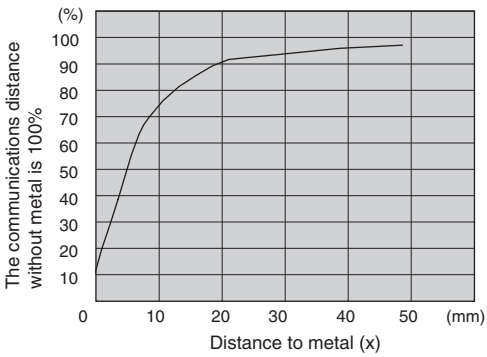


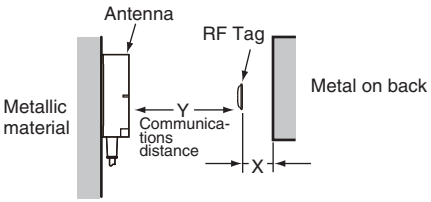
● V680-HS63 and V680-D1KP66T-SP





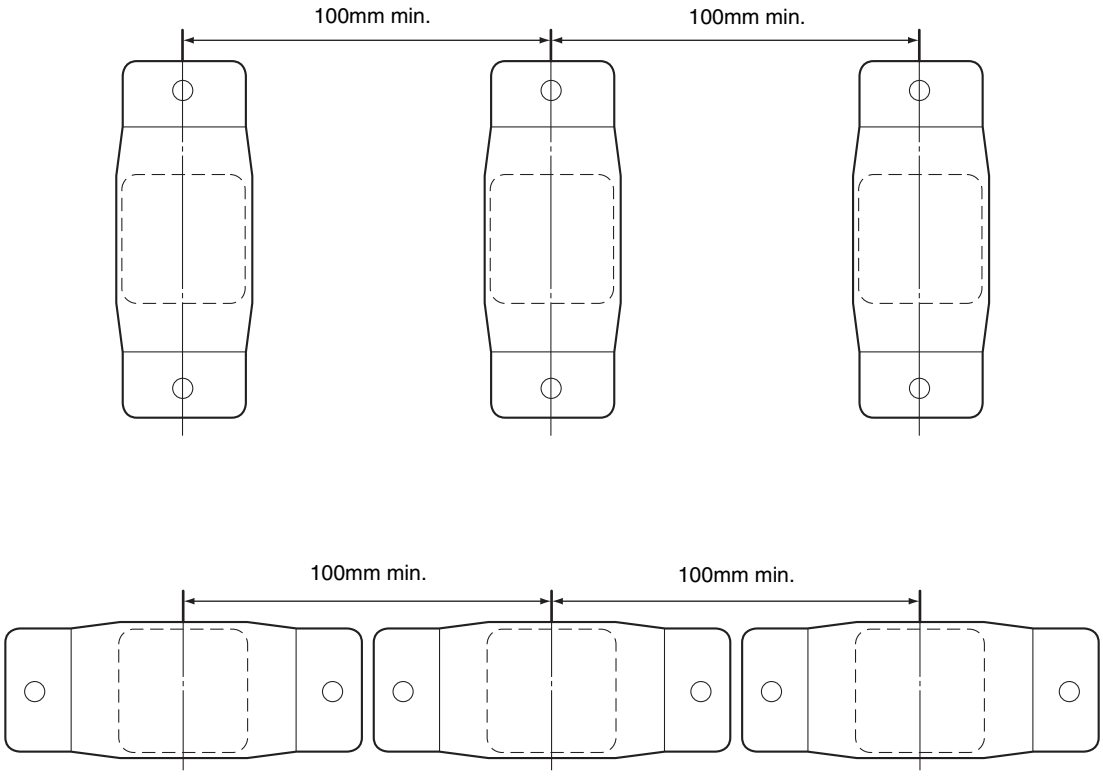
● V680-HS65 and V680-D1KP66T-SP





▪ Mutual Interference with RF Tags (Reference)

To prevent malfunctioning due to mutual interference when using more than one RF Tag, leave sufficient space between them as shown in the following diagram.



▪ Influence of RF Tag Angle (Reference)

Install Antennas and RF Tags as parallel to each other as possible.

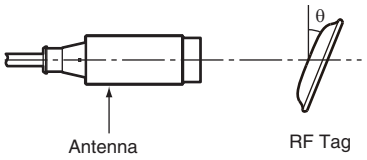
Communications are possible even when an Antenna and an RF Tag are mounted at an angle, but the communications distance will be shortened. The relation between the angle and the communications distance is shown below.

Reduction in Communications Distance for V680-D1KP66T-SP Angle

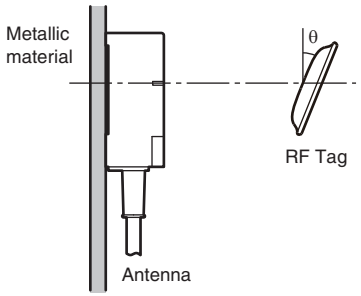
	RF Tag angle (θ°)				
	0	10	20	30	40
V680-HS52 and V680-D1KP66T-SP	0%	−1%	−2%	−4%	−7%
V680-HS63 and V680-D1KP66T-SP	0%	−2%	−3%	−5%	−9%
V680-HS65 and V680-D1KP66T-SP	0%	−1%	−3%	−6%	−11%

Measurement Conditions

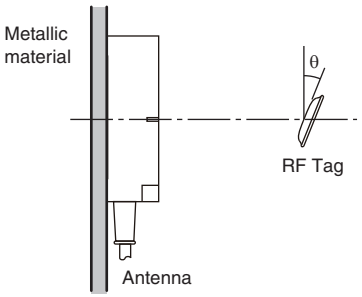
- V680-HS52 and V680-D1KP66T-SP



- V680-HS63 and V680-D1KP66T-SP



- V680-HS65 and V680-D1KP66T-SP



■ V680-D2KF52M

▪ Differences in Surrounding Metals

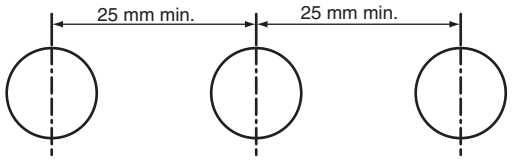
Communications distances are affected by the type of metal in back of or surrounding the RF Tag, as shown in the following table.

	Steel	SUS	Brass	Aluminum
V680-D2KF52M	100%	80% to 85%	80% to 85%	75% to 80%

Note: The value for steel around or behind the RF Tag is set to 100%.

▪ Mutual Interference with RF Tags (Reference)

To prevent malfunctioning due to mutual interference when using more than one RF Tag, leave sufficient space between them as shown in the following diagram.



▪ Influence of RF Tag Angle (Reference)

Install Antennas and RF Tags as parallel to each other as possible.

Communications are possible even when an Antenna and an RF Tag are mounted at an angle, but the communications distance will be shortened. The relation between the angle and the communications distance is shown below.

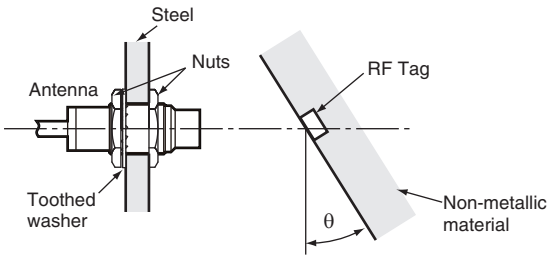
Reduction in Communications Distance for V680-D2KF52M Angle

	RF Tag angle (θ°)				
	0	10	20	30	40
V680-HS51 and V680-D2KF52M	0%	−2%	−6%	--	−22%
V680-HS51 and V680-D2KF52M (Metal on back: Steel)	0%	0%	0%	−7%	−30%
V680-HS52 and V680-D2KF52M	0%	0%	0%	−2%	−5%
V680-HS52 and V680-D2KF52M (Metal on back: Steel)	0%	−2%	−7%	---	---
V680-HS63 and V680-D2KF52M	0%	0%	−1%	−4%	−9%

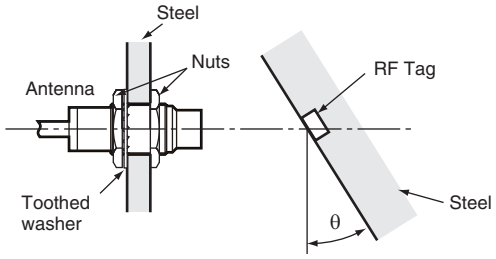
---: Measurement is not possible because Antenna and RF Tag would strike each other.

Measurement Conditions

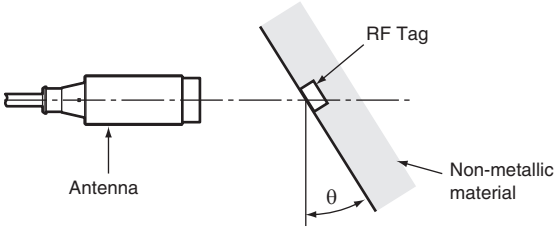
● V680-HS51 and V680-D2KF52M



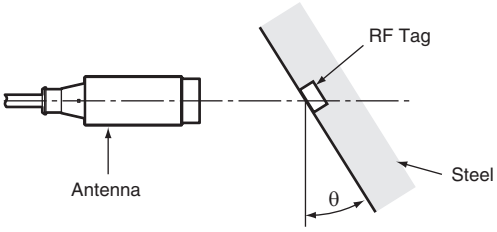
● V680-HS51 and V680-D2KF52M (Metal on back: Steel)



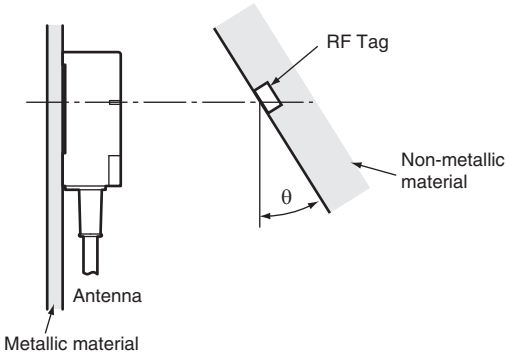
● V680-HS52 and V680-D2KF52M



● V680-HS52 and V680-D2KF52M (Metal on back: Steel)



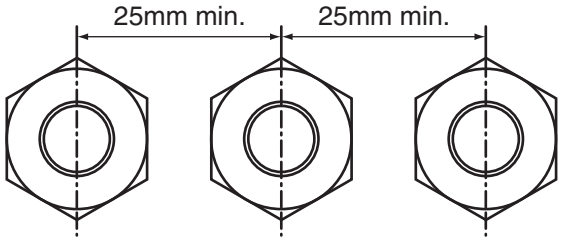
● V680-HS63 and V680-D2KF52M



■ V680-D2KF52M-BT01/-D2KF52M-BT11

▪ Mutual Interference with RF Tags (Reference)

To prevent malfunctioning due to mutual interference when using more than one RF Tag, leave sufficient space between them as shown in the following diagram.



▪ Influence of RF Tag Angle (Reference)

Install Antennas and RF Tags as parallel to each other as possible.

Communications are possible even when an Antenna and an RF Tag are mounted at an angle, but the communications distance will be shortened. The relation between the angle and the communications distance is shown below.

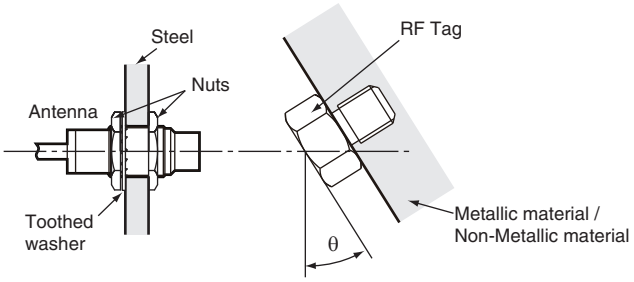
Percentage of Change in Communications Distance for 680-D2KF52M-BT01/-D2KF52M-BT11 Angle

	RF Tag angle (θ°)				
	0	10	20	30	40
V680-HS51 and V680-D2KF52M-BT01/-D2KF52M-BT11	0%	–32%	–50%	---	---
V680-HS52 and V680-D2KF52M-BT01/-D2KF52M-BT11	0%	–32%	–42%	---	---

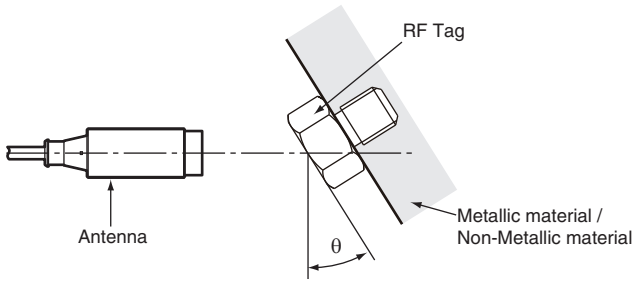
---: Measurement is not possible because Antenna and RF Tag would strike each other.

Measurement Conditions

- V680-HS51 and V680-D2KF52M-BT01/-D2KF52M-BT11



- V680-HS52 and V680-D2KF52M-BT01/-D2KF52M-BT11

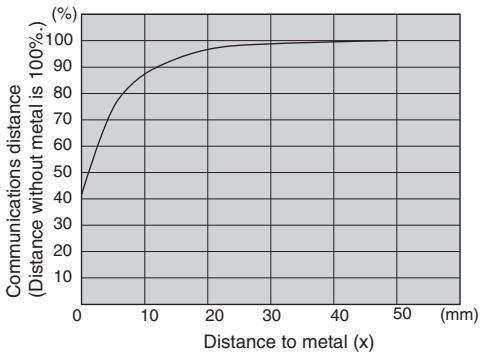


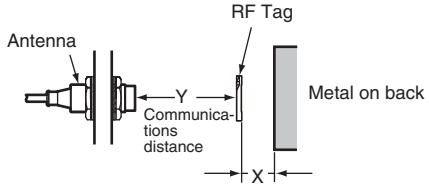
■ V680-D2KF67

▪ Effect of Metal on Back of RF Tags (Reference)

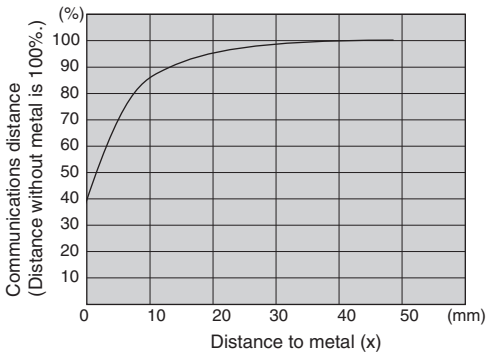
The V680-D2KF67 communications distance is reduced if there is any metallic material on the back of the RF Tag.

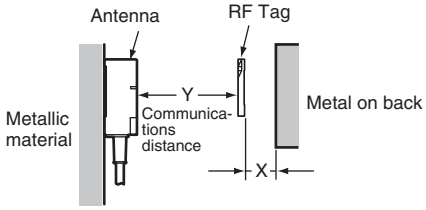
● V680-HS52 and V680-D2KF67



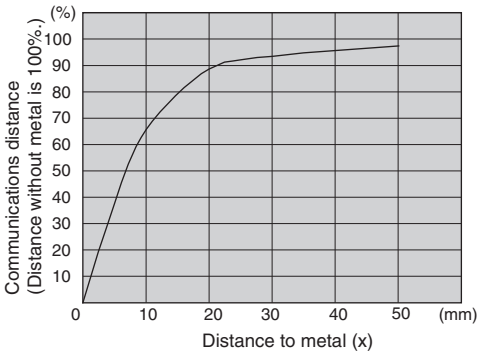


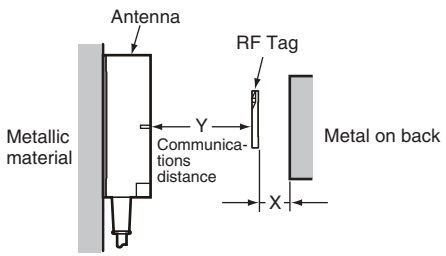
● V680-HS63 and V680-D2KF67





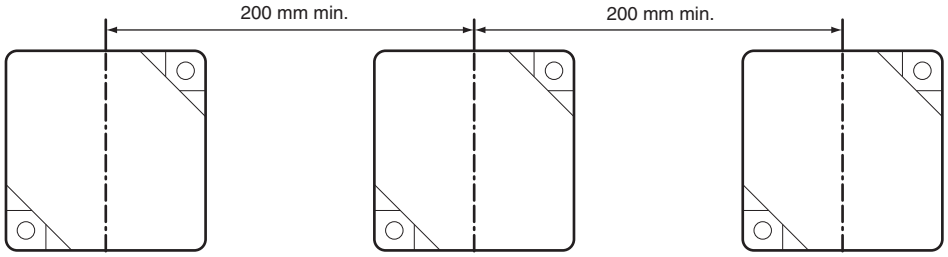
● V680-HS65 and V680-D2KF67





▪ Mutual Interference with RF Tags (Reference)

To prevent malfunctioning due to mutual interference when using more than one RF Tag, leave sufficient space between them as shown in the following diagram.



▪ Influence of RF Tag Angle (Reference)

Install Antennas and RF Tags as parallel to each other as possible.

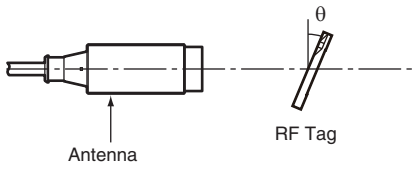
Communications are possible even when an Antenna and an RF Tag are mounted at an angle, but the communications distance will be shortened. The relation between the angle and the communications distance is shown below.

Reduction in Communications Distance for V680-D2KF67 Angle

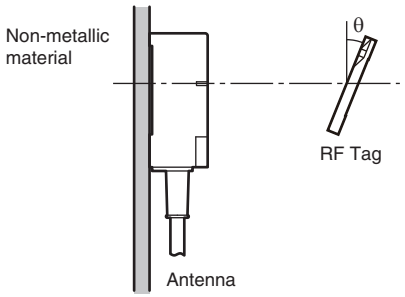
	RF Tag angle (θ°)				
	0	10	20	30	40
V680-HS52 and V680-D2KF67	0%	0%	0%	–1%	–2%
V680-HS63 and V680-D2KF67	0%	–1%	–2%	–3%	–6%
V680-HS65 and V680-D2KF67	0%	–1%	–3%	–7%	–11%

Measurement Conditions

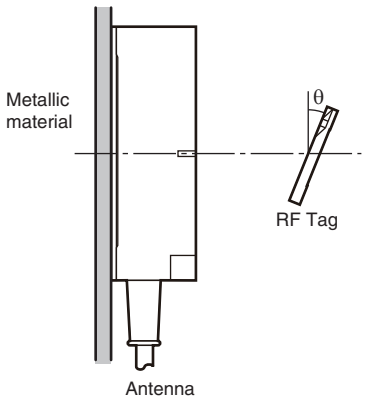
- V680-HS52 and V680-D2KF67



- V680-HS63 and V680-D2KF67



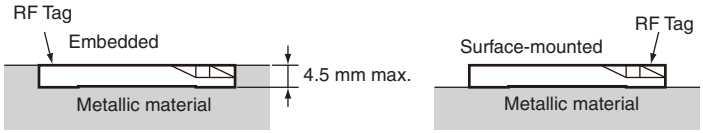
- V680-HS65 and V680-D2KF67



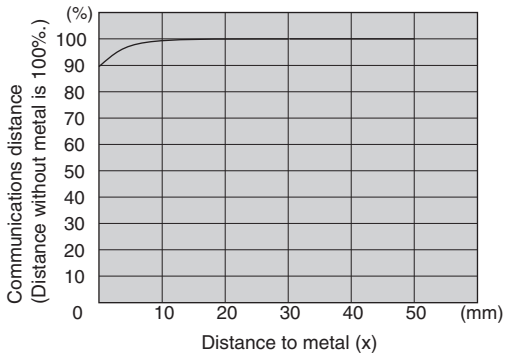
■ V680-D2KF67M

▪ Effect of Surrounding Metals (Reference)

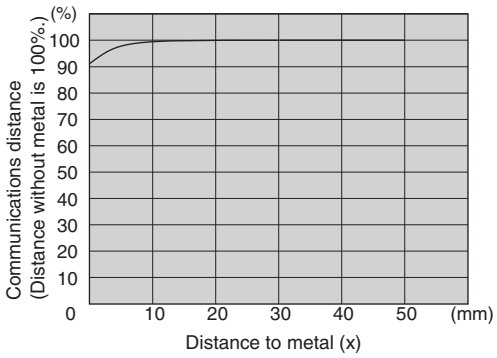
The V680-D2KF67M can be surface-mounted or it can be embedded in metal. If it is embedded in metal, the height of the metal casing must not exceed that of the RF Tag.



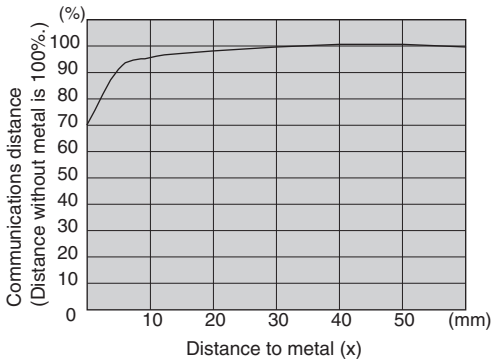
● V680-HS52 and V680-D2KF67M

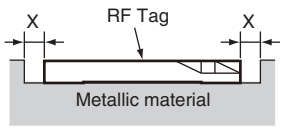


● V680-HS63 and V680-D2KF67M



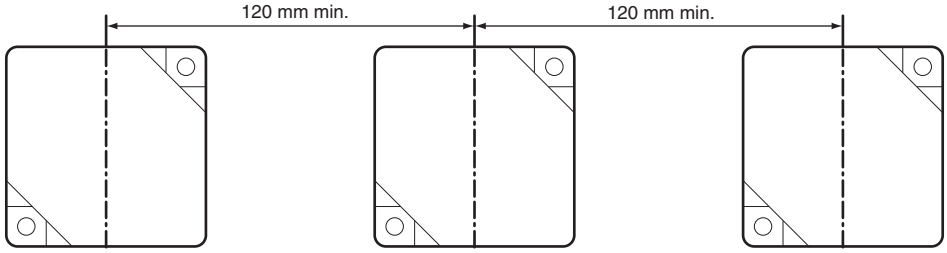
● V680-HS65 and V680-D2KF67M





▪ Mutual Interference with RF Tags (Reference)

To prevent malfunctioning due to mutual interference when using more than one RF Tag, leave sufficient space between them as shown in the following diagram.



▪ Influence of RF Tag Angle (Reference)

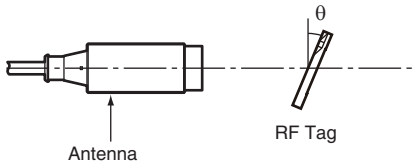
Install Antennas and RF Tags as parallel to each other as possible.
Communications are possible even when an Antenna and an RF Tag are mounted at an angle, but the communications distance will be shortened. The relation between the angle and the communications distance is shown below.

Reduction in Communications Distance for V680-D2KF67M Angle

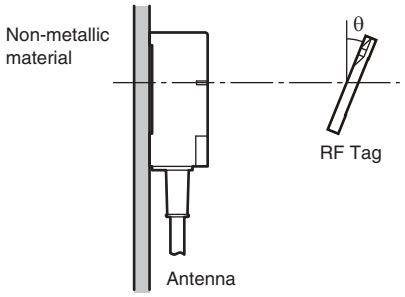
	RF Tag angle (θ°)				
	0	10	20	30	40
V680-HS52 and V680-D2KF67M (Metal on back: Steel)	0%	−1%	−2%	−4%	−6%
V680-HS63 and V680-D2KF67M (Metal on back: Steel)	0%	−2%	−5%	−8%	−14%
V680-HS65 and V680-D2KF67M (Metal on back: Steel)	0%	−2%	−7%	−16%	−31%

Measurement Conditions

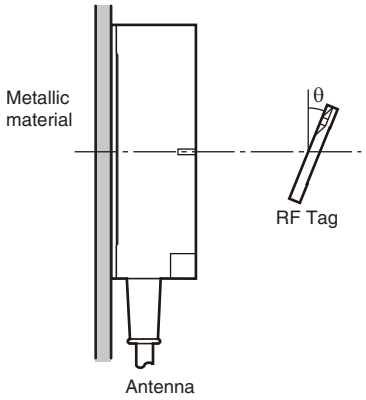
- V680-HS52 and V680-D2KF67M (Metal on back: Steel)



- V680-HS63 and V680-D2KF67M (Metal on back: Steel)



- V680-HS65 and V680-D2KF67M (Metal on back: Steel)

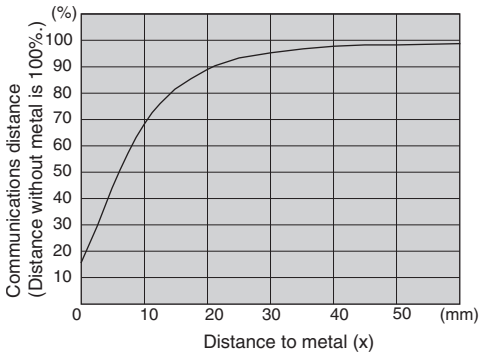


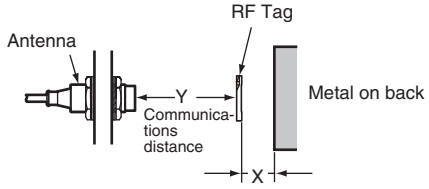
■ V680-D8KF67

▪ Effect of Metal on Back of RF Tags (Reference)

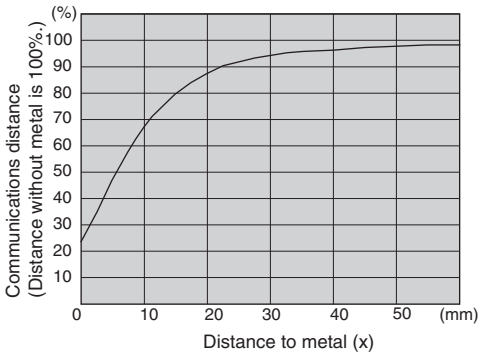
The V680-D8KF67 communications distance is reduced if there is any metallic material on the back of the RF Tag.

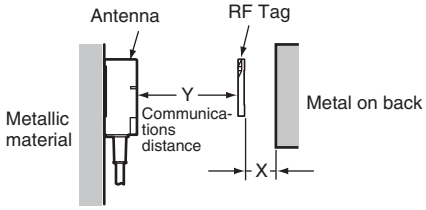
● V680-HS52 and V680-D8KF67



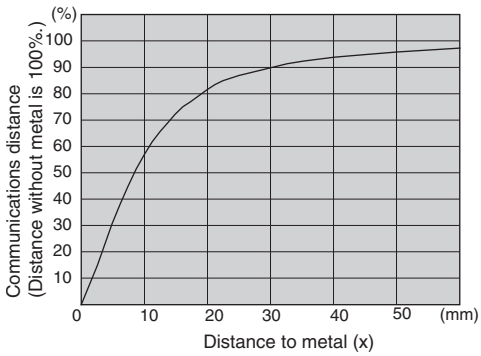


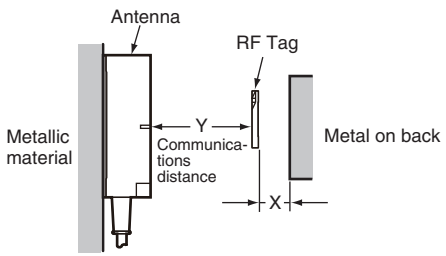
● V680-HS63 and V680-D8KF67





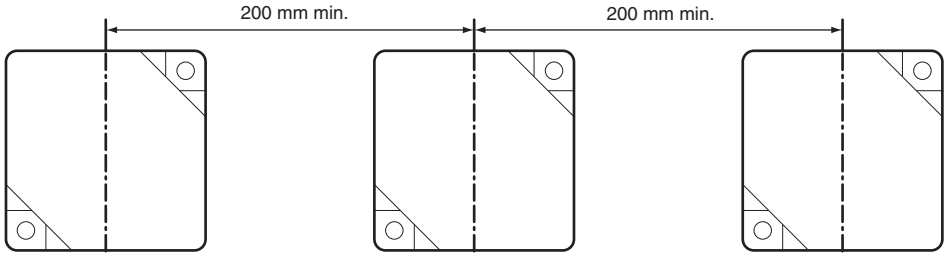
● V680-HS65 and V680-D8KF67





▪ Mutual Interference with RF Tags (Reference)

To prevent malfunctioning due to mutual interference when using more than one RF Tag, leave sufficient space between them as shown in the following diagram.



▪ Influence of RF Tag Angle (Reference)

Install Antennas and RF Tags as parallel to each other as possible.

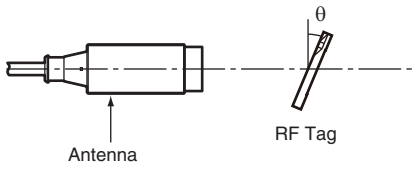
Communications are possible even when an Antenna and an RF Tag are mounted at an angle, but the communications distance will be shortened. The relation between the angle and the communications distance is shown below.

Reduction in Communications Distance for V680-D2KF67 Angle

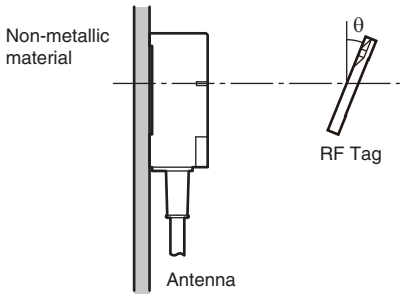
	RF Tag angle (θ°)				
	0	10	20	30	40
V680-HS52 and V680-D8KF67	0%	-1%	-1%	–1%	–1%
V680-HS63 and V680-D8KF67	0%	–1%	–1%	–2%	–4%
V680-HS65 and V680-D8KF67	0%	–1%	–2%	–5%	–9%

Measurement Conditions

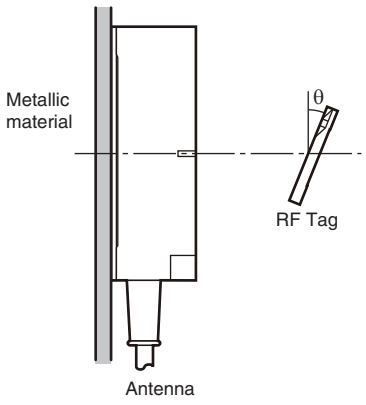
- V680-HS52 and V680-D8KF67



- V680-HS63 and V680-D8KF67



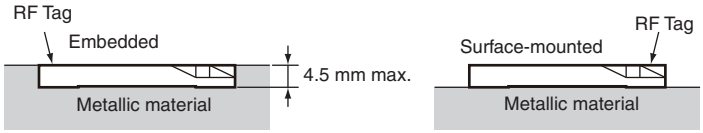
- V680-HS65 and V680-D8KF67



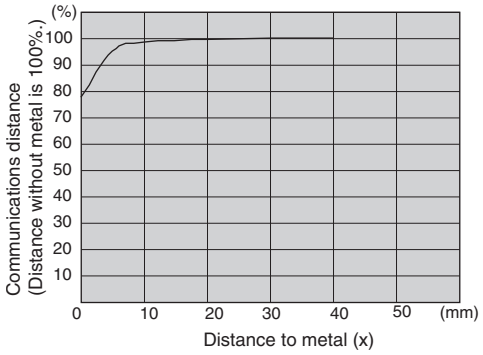
■ V680-D8KF67M

▪ Effect of Surrounding Metals (Reference)

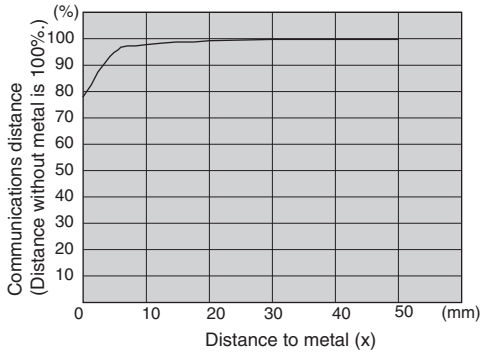
The V680-D8KF67M can be surface-mounted or it can be embedded in metal. If it is embedded in metal, the height of the metal casing must not exceed that of the RF Tag.



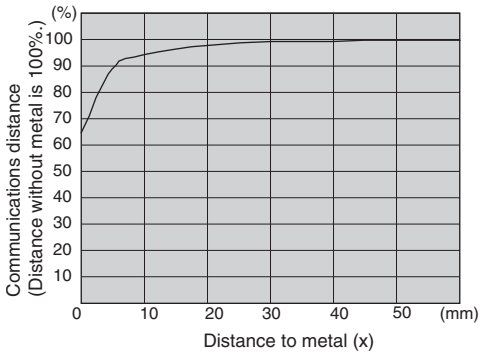
● V680-HS52 and V680-D8KF67M

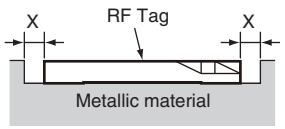


● V680-HS63 and V680-D8KF67M



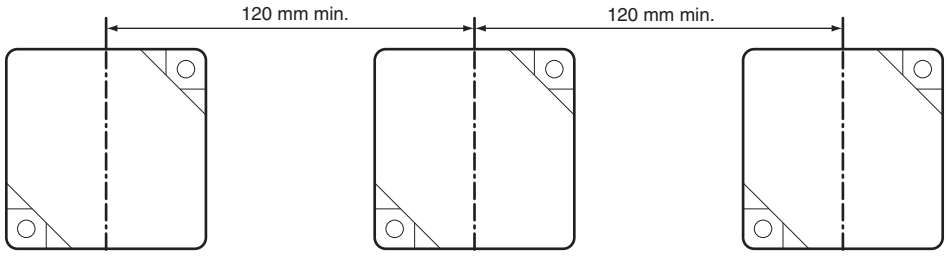
● V680-HS65 and V680-D8KF67M





▪ Mutual Interference with RF Tags (Reference)

To prevent malfunctioning due to mutual interference when using more than one RF Tag, leave sufficient space between them as shown in the following diagram.



▪ Influence of RF Tag Angle (Reference)

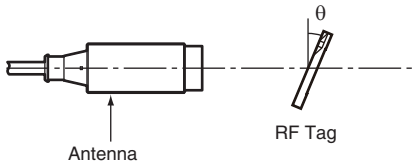
Install Antennas and RF Tags as parallel to each other as possible.
Communications are possible even when an Antenna and an RF Tag are mounted at an angle, but the communications distance will be shortened. The relation between the angle and the communications distance is shown below.

Reduction in Communications Distance for V680-D2KF67M Angle

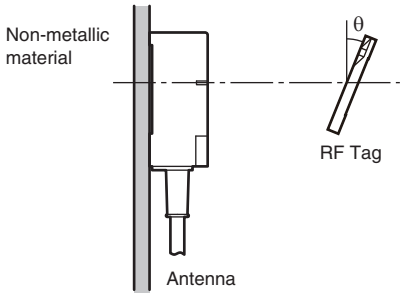
	RF Tag angle (θ°)				
	0	10	20	30	40
V680-HS52 and V680-D8KF67M (Metal on back: Steel)	0%	0%	0%	0%	0%
V680-HS63 and V680-D8KF67M (Metal on back: Steel)	0%	0%	−1%	−2%	−5%
V680-HS65 and V680-D8KF67M (Metal on back: Steel)	0%	−1%	−3%	−9%	−19%

Measurement Conditions

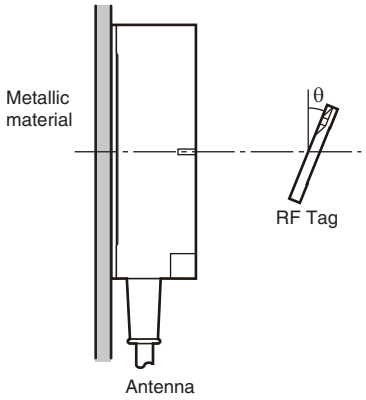
- V680-HS52 and V680-D8KF67M (Metal on back: Steel)



- V680-HS63 and V680-D8KF67M (Metal on back: Steel)



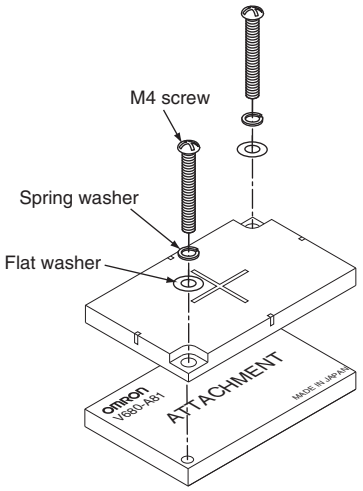
- V680-HS65 and V680-D8KF67M (Metal on back: Steel)



■ V680-D8KF67/-D32KF68

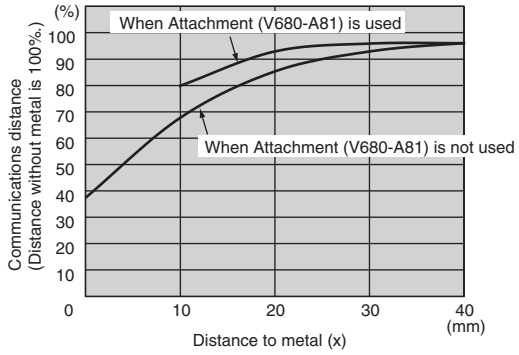
▪ Effect of Surrounding Metals (Reference)

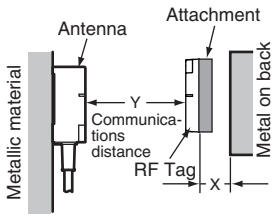
• Special Attachment (V680-A81) Installation Direction



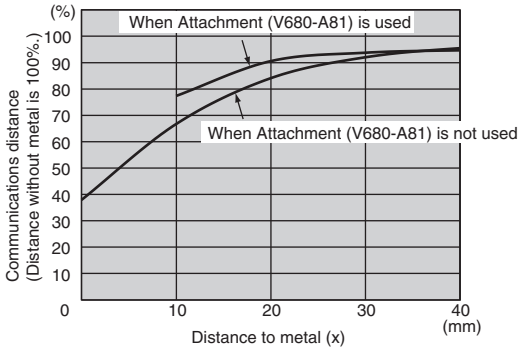
The communications distance will be reduced if there is metal on the back of an RF Tag. When mounting on a metal surface, use the V680-A81 special Attachment (sold separately) or insert a non-metallic spacer (e.g., plastic, resin, etc.).

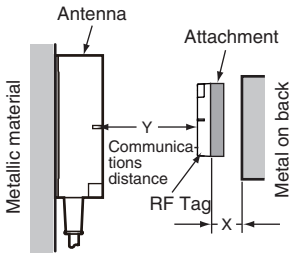
● V680-HS63 and V680-D8KF68/-D32KF68





● V680-HS65 and V680-D8KF68/-D32KF68

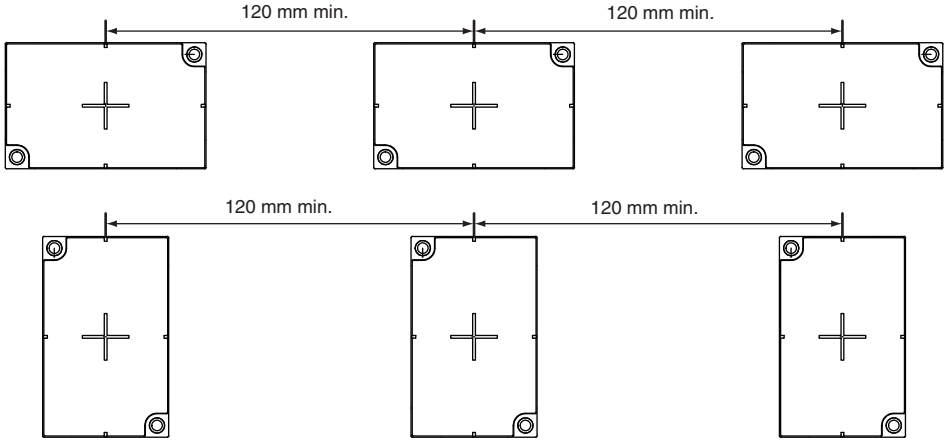




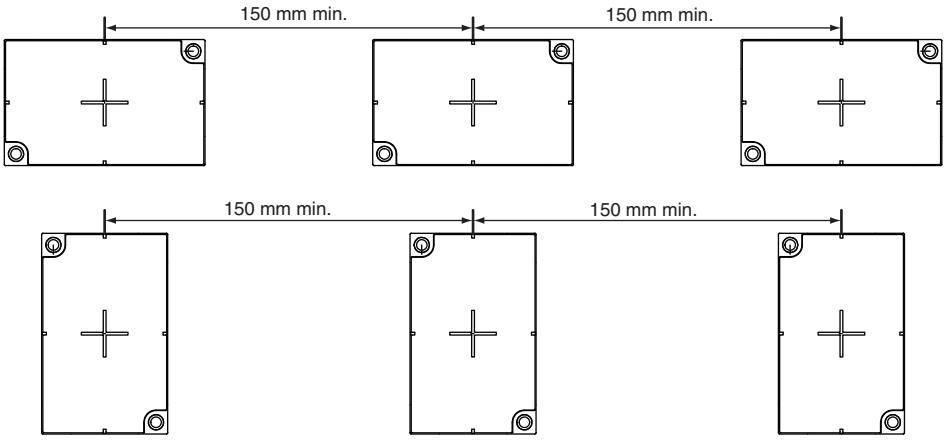
▪ Mutual Interference with RF Tags (Reference)

To prevent malfunctioning due to mutual interference when using more than one RF Tag, leave sufficient space between them as shown in the following diagram.

When V680-HS63 Is Used



When V680-HS65 Is Used



▪ Influence of RF Tag Angle (Reference)

Install Antennas and RF Tags as parallel to each other as possible.

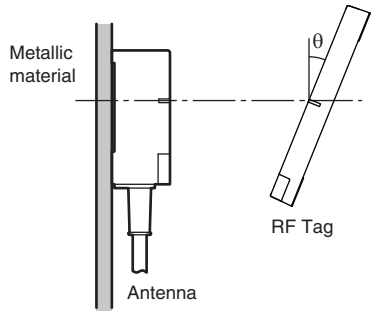
Communications are possible even when an Antenna and an RF Tag are mounted at an angle, but the communications distance will be shortened. The relation between the angle and the communications distance is shown below.

Reduction in Communications Distance for V680-D8KF68/-D32KF68 Angle

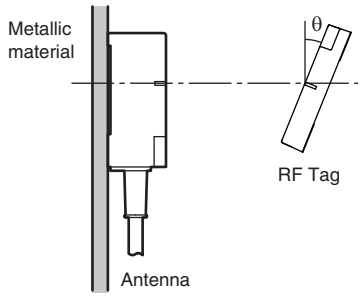
	RF Tag angle (θ°)				
	0	10	20	30	40
V680-HS63 and V680-D8KF68/-D32KF68 (Horizontal-facing RF Tag)	0%	0%	0%	0%	0%
V680-HS63 and V680-D8KF68/-D32KF68 (Vertical-facing RF Tag)	0%	−1%	−2%	−3%	−5%
V680-HS65 and V680-D8KF68/-D32KF68 (Horizontal-facing RF Tag)	0%	−1%	−2%	−4%	−6%
V680-HS65 and V680-D8KF68/-D32KF68 (Vertical-facing RF Tag)	0%	−1%	−3%	−6%	−10%

Measurement Conditions

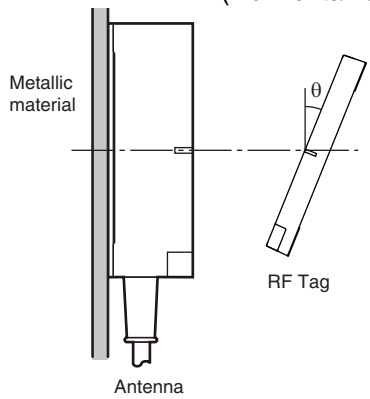
- V680-HS63 and V680-D8KF68/-D32KF68 (Horizontal-facing RF Tag)



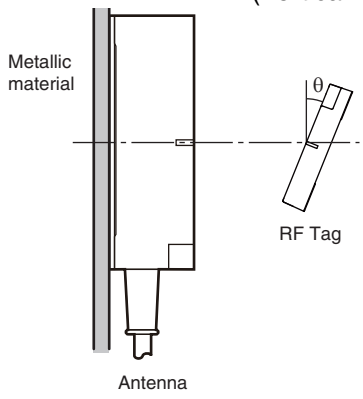
- V680-HS63 and V680-D8KF68/-D32KF68 (Vertical-facing RF Tag)



- V680-HS65 and V680-D8KF68/-D32KF68 (Horizontal-facing RF Tag)



- V680-HS65 and V680-D8KF68/-D32KF68 (Vertical-facing RF Tag)



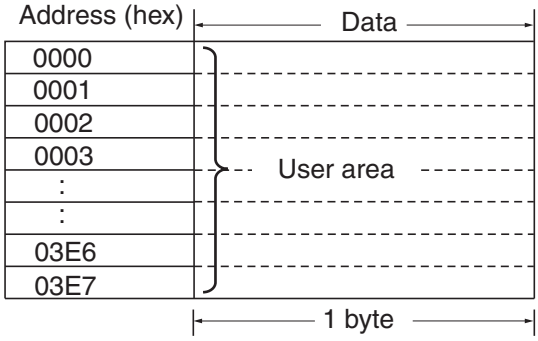
RF Tag Memory Capacities and Memory Types

(As of December 2011)

Model	Memory capacity (user memory)	Memory type	Life expectancy
V680-D1KP52MT V680-D1KP52M-BT01 V680-D1KP52M-BT11 V680-D1KP53M V680-D1KP66T V680-D1KP66MT V680-D1KP66T-SP	1,000 bytes	EEPROM	Overwrite operations: 100,000 times for each block at 25°C Data retention: 10 years (up to 85°C)
V680-D2KF52M V680-D2KF52M-BT01 V680-D2KF52M-BT11 V680-D2KF67 V680-D2KF67M	2,000 bytes	FRAM	Number of accesses: 10 billion times Data retention: 10 years (up to 55°C)
V680-D8KF67 V680-D8KF67M V680-D8KF68	8,192 bytes		
V680-D32KF68	32,744 bytes		

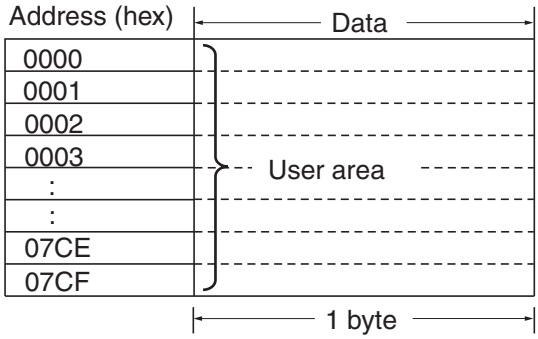
RF Tag Memory Map

V680-D1KP□□



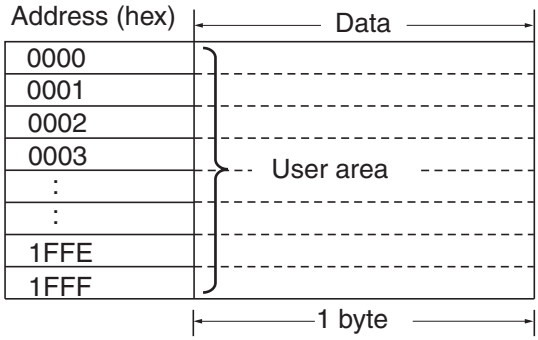
EEPROM is used as memory in the RF Tags.
The memory capacity available to the user is 1,000bytes, including 0000 hex to 0003 hex the Write Protection Setting Area).

V680-D2KF□□



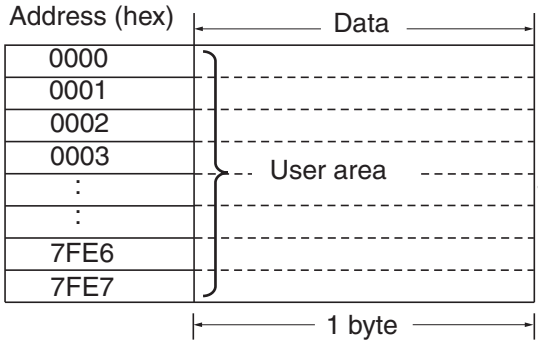
FRAM is used as memory in the RF Tags.
The memory capacity available to the user is 2,000bytes, including 0000 hex to 0003 hex the Write Protection Setting Area).

V680-D8KF□□



FRAM is used as memory in the RF Tags.
The memory capacity available to the user is 8,192bytes, including 0000 hex to 0003 hex the Write Protection Setting Area).

V680-D32KF□□



FRAM is used as memory in the RF Tags.
The memory capacity available to the user is 32,744bytes, including 0000 hex to 0003 hex the Write Protection Setting Area).

CHECK!

The access to the memory is executed at every block. 1 block is 8bytes (every 8 addresses : □□□0 hex to □□□7 hex, □□□8 hex to □□□F hex)

Chemical Resistance of the Antennas and RF Tags

Chemical Resistance of the Antennas

■ Applicable Models

V680-HS51 V680-HS52-W/R V680-HS63-W/R V680-HS65-W/R

ABS resin is used for case material and epoxy resin for filling material. Refer to the following lists and do not use chemicals that affect ABS and epoxy resin.

▪ Chemicals That Cause Deformations, Cracks, Etc.

ABS resin	Epoxy resin
Trichlene, acetone, xylene, toluene, gasoline, creosol, methylene chloride, phenol, cyclohexane, aqua regia, chromic acid, sulfuric acid (90% RT), methyl ethyl ketone, aniline, nitrobenzine, monochlorobenzine, pyridine, nitric acid (60% RT), formic acid (80% RT)	Aqua regia, chromic acid, sulfuric acid (90% RT), nitric acid (60% RT), ammonia solution, acetone, methylene chloride, phenol

▪ Chemicals That May Cause Discoloration, Swelling, Etc.

ABS resin	Epoxy resin
Hydrochloric acid, alcohol, Freon, sodium hydroxide, hydrogen peroxide, benzine, sulfuric acid (10% RT), nitric acid (10% RT), phosphoric acid (85% RT), ammonia solution	Sulfuric acid (10% RT), nitric acid (10% RT), hydrochloric acid (30% RT), acetic acid (50% RT), oxalic acid, calcium hydroxide, benzine, creosol, alcohol, cyclohexane, toluene, xylene, benzine, grease

▪ Chemicals That Do Not Affect ABS Resin or Epoxy Resin

ABS resin	Epoxy resin
Ammonia, kerosine, mineral oil, developer, Yushiroken S50, Chemi-Cool Z, Velocity No. 3, Yushiroken EEE-30Y, petroleum, grease, acetic acid, oxalic acid, calcium hydroxide, phosphoric acid (30% RT), hydrochloric acid (10% RT), potassium hydroxide	Ammonia, hydrochloric acid (10% RT), potassium hydroxide, petroleum, gasoline, Yushiroken S50, Chemi-Cool Z, Velocity No. 3, Yushiroken EEE-30Y

Note: The above results are from tests conducted a room temperature (23°C). Even if the chemicals do not affect the ABS or epoxy resins at room temperature, they may affect the resins at higher or lower temperatures. Check the chemicals carefully in advance.

Chemical Resistance of RF Tags

■ Applicable Models

V680-D1KP52MT V680-D1KP52M-BT01 V680-D1KP52M-BT11 V680-D1KP53M
V680-D2KF52M V680-D2KF52M-BT01 V680-D2KF52M-BT11

PPS resin is used for case material and epoxy resin for filling material. Refer to the following lists and do not use chemicals that affect PPS and epoxy resin.
RF Tags cannot be used in applications with explosion-proof specifications.

▪ Chemicals That Cause Deformations, Cracks, Etc.

PPS resin	Epoxy resin
Aqua regia	Aqua regia, chromic acid, sulfuric acid (90% RT), nitric acid (60% RT), ammonia solution, acetone, methylene chloride, phenol

▪ Chemicals That May Cause Discoloration, Swelling, Etc.

PPS resin	Epoxy resin
Nitric acid (60% RT)	Sulfuric acid (10% RT), nitric acid (10% RT), concetrated hydrochloric acid, acetic acid (50% RT), oxalic acid, calcium hydroxide, benzine, creosol, alcohol, cyclohexane, toluene, xylene, benzine, grease

▪ Chemicals that Do Not Affect PPS Resin or Epoxy Resin

PPS resin	Epoxy resin
Hydrochloric acid (37%RT), sulfuric acid (98%RT), nitric acid (40%RT), hydrogen fluoride solution (40%RT), chromic acid (40%RT), hydrogen peroxide solution (28%RT), sodium hydroxide solution (60%RT), ammonia solution (28%RT), sodium chloride (10%RT), sodium carbonate (20%RT), sodium hypochlorite solution, phenol solution (5%RT), glacial acetic acid, acetic acid, oleic acid, methyl alcohol (95%RT), ethyl alcohol (95%RT), ethyl acetate, sebacic acid, diethylhexyl, acetone, diethyl ether, n-heptane, 2-2-4 trimethylpentane, benzine, toluene, aniline, mineral oil, gasoline, insulating oil, dichloroethylene, carbon tetrachloride	Ammonia, hydrochloric acid (10% RT), potassium hydroxide, petroleum, gasoline, Yushiroken S50, Chemi-Cool Z, Velocity No. 3, Yushiroken EEE-30Y, methyl ethyl ketone, sodium hydroxide (10%RT)

Note: The above results are from tests conducted a room temperature (23°C). Even if the chemicals do not affect the PPS or epoxy resins at room temperature, they may affect the resins at higher or lower temperatures. Check the chemicals carefully in advance.

■ Applicable Models

V680-D1KP66T/MT

PPS resin is used for case material. Refer to the following lists and do not use chemicals that affect PPS resin.

Chemical		At room temperature	90°C
Hydrochloric acid	37%	A	A
	10%	A	A
Sulfuric acid	98%	A	B
	50%	A	A
	30%	A	A
	3%	A	A
Nitric acid	60%	B	C
	40%	A	B
	10%	A	A
Hydrogen fluoride solution	40%	A	A
Chromic acid	40%	A	A
Hydrogen peroxide solution	28%	A	B
	3%	A	A
Sodium hydroxide solution	60%	A	A
	10%	A	A
	1%	A	A
Ammonia solution	28%	A	B
	10%	A	B
Sodium chloride	10%	A	A
Sodium carbonate	20%	A	A
	2%	A	A

Chemical		At room temperature	90°C
Sodium hypochlorite solution		A	A
Phenol solution	5%	A	A
Glacial acetic acid		A	A
Acetic acid		A	A
Oleic acid		A	A
Methyl alcohol	95%	A	A
Ethyl alcohol	95%	A	A
Ethyl acetate		A	A
Sebacic acid diethylhexyl		A	A
Acetone		A	A
Diethyl ether		A	A
n-heptane		A	A
2-2-4 trimethylpentane		A	A
Benzene		A	A
Toluene		A	A
Aniline		A	A
Mineral oil		A	A
Gasoline		A	A
Insulating oil		A	A
Dichloroethylene		A	A
Carbon tetrachloride		A	A

A: Has no adverse effect, B: May cause discoloration, swelling, etc., C: Causes deformation, cracks, etc.

The above table shows the extent of changes in PPS resin exposed to each chemical at room temperature and at 90°C. If actual chemicals, concentrations, and temperatures are different from those shown in the tables, always conduct tests under the actual conditions in which the RF Tags are to be used.

■ Applicable Model

V680-D1KP66T-SP

PFA is used for the V680-D1KP66T-SP RF Tag coating.
Refer to the following materials and check the characteristics before using them.

▪ Chemical Resistance of PFA Fluororesin (Reference Material)

PFA: Tetrafluorethylene-Perfluoroalkylvinyletheir copolymer

PFA fluororesin is non-reactive to most chemicals.
It reacts to alkaline metals in the melted state, F2 (fluorine) under high temperature and high pressure, and some halogen derivatives.
The results testing by immersing the PFA material in commonly used organic and inorganic chemicals are shown below. This testing involves placing a compression molded test piece (1.3-mm thickness) in the chemicals at room temperature for one week (168 hours), then removing it to measure the change in weight, tensile strength, and stretch. If the change in tensile strength is less than 15%, elasticity is less than 10%, and weight is less than 0.5%, the effect is considered minimal.
When fluids that wet the resin surface, such as trichloroacetic acid, Tri-n-butylamine hydrofluoride, perchloroethylene, and carbon tetrachloride, are applied at high temperatures, it is likely that the PFA will increase weight by absorption and lose its tensile strength. Even if chemicals that are solvents are absorbed, the molecular structure will not change. If the PFA is subject to deformation at high temperatures, deformation at high pressures, or other physical damage, the absorbed chemicals will repeatedly expand and contract within the PFA, causing physical defects such as cracks or blistering. However, these are problems that are likely to occur with any type of plastic.

Inorganic Chemicals

Chemical	Test temperature (°C)	Residual characteristic (%)		Weight gain (%)
		Tensile strength	Stretch	
Concentrated hydrochloric acid	120	98	100	0.0
Concentrated sulfuric acid	120	95	98	0.0
Hydrofluoric acid (60%RT)	23	99	99	0.0
Fuming sulfuric acid	23	95	96	0.0
Aqua regia	120	99	100	0.0
Chromic acid (50% RT)	120	93	97	0.0
Concentrated nitric acid	120	95	98	0.0
Fuming nitric acid	23	99	99	0.0
66	98	100	100	0.0
Caustic soda (50% RT)	120	93	99	0.4
Hydrogen peroxide solution (30% RT)	23	93	95	0.0
Bromine	23	99	100	0.0
Chlorine	120	92	100	0.5
Ferrous chloride (25% RT)	100	93	98	0.0
Zinc chloride (25% RT)	100	96	100	0.0
Sulfuryl chloride	69	83	100	2.7
Chlorosulfonic acid	151	91	100	0.0
Concentrated phosphoric acid	100	93	100	0.0

Organic Chemicals

Chemical	Test temperature (°C)	Residual characteristic (%)		Weight gain (%)
		Tensile strength	Stretch	
Water-acetic acid	118	95	100	0.4
Acetic anhydride	139	91	99	0.3
Trichloroacetic acid	196	90	100	2.2
Isooctane	99	94	100	0.7
Naphtha	100	91	100	0.5
Mineral oil	180	87	95	0.0
Toluene	110	88	100	0.7
o-Creosol	191	92	96	0.2
Nitrobenzene	210	90	100	0.7
Benzyl alcohol	205	93	99	0.3
Aniline	185	94	100	0.3
n-Butylamine	78	86	97	0.4
Ethylenediamine	117	96	100	0.1
Tetrahydrofuran	66	88	100	0.7
Benzaldehyde	179	90	99	0.5
Cyclohexane	156	92	100	0.4
Methyl ethyl ketone	80	90	100	0.6
Acetophenone	202	90	100	0.6
Dimethylphtalate	200	98	100	0.3
n-Butyl acetate	125	93	100	0.5
Tri-n-butyl phosphate	200	91	100	2.0
Methylene chloride	40	94	100	0.8
Perchloroethylene	121	86	100	2.0
Carbon tetrachloride	77	87	100	2.3
Dimethyl formamide	154	96	100	0.2
Dimethyl sulfoxide	189	95	100	0.1
Dioxane	101	92	100	0.6

Reference: Satokawa Takaomi, Fluoro-resin Handbook, Nikkan Kogyo Shimbun Ltd.

■ Applicable Models

V680-D2KF67/67M V680-D8KF68/D32KF68 V680-D8KF67/67M

Chemicals that affect RF Tags are shown below.
Polybutylene terephthalate (PBT) resin is used for case material and epoxy resin for filling material.
Refer to the following lists and do not use chemicals that affect PBT and epoxy resins.
RF Tags cannot be used in applications with explosion-proof specifications.

▪ Chemicals That Cause Deformations, Cracks, Etc.

PBT resin	Epoxy resin
Acetone, trichloroethylene, ethylene dichloride, sodium hydroxide, and other alkaline substances	Aqua regia, chromic acid, sulfuric acid (90% RT), nitric acid (60% RT), liquid ammonia, acetone, methylene chloride, phenol

▪ Chemicals That May Cause Discoloration, Swelling, Etc.

PBT resin	Epoxy resin
Hydrochloric acid (10% RT), acetic acid (5% RT), benzene	Sulfuric acid (10% RT), nitric acid (10% RT), concentrated hydrochloric acid, acetic acid (50% RT), oxalic acid, calcium hydroxide, benzene, cresol, alcohol, microhexanon, toluene, xylene, benzene, grease

▪ Chemicals that Do Not Affect PPS Resin or Epoxy Resin

PBT resin	Epoxy resin
Nitric acid (30% RT), concentrated hydrochloric acid, acetic acid, ethyl acetate (100% RT), potassium permaganate (5% RH), ethyl acetate, carbon tetrachloride, methanol, ethanol, gasoline	Ammonia, hydrochloric acid (10% RT), potassium hydrate, petroleum, gasoline, Yushiroken S50, Chemi-cool Z, Velocity No. 3, Yushiroken EEE-30Y, methyl ethyl ketone, sodium hydroxide

Note: The above results are from tests conducted at room temperature (23°C). Even if the chemicals do not affect the PPS or epoxy resins at room temperature, they may affect the resins at higher or lower temperatures. Check the chemicals carefully in advance.

V600-Compatible Mode

The V680-series ID Flag Sensor supports all functions of the previous V600 series, so that the customer using V600 series can apply the existing programming assets. This section describes the functions of the V600-compatible Mode.

Correspondence table for V600-Compatible Mode setting switch

Model of V600 series	Switch Name of V600 series	Setting Value	Switch Name of V680 series	correspondence setting value
V600-HAR91 V600-HAR81 V600-HAM91 V600-HAM81	Address Switche	---	Access Address Setting Switch	---
	Access Mode Switch	SYNC (SYNC MODE)	Access Mode Setting Switch	SYNC2 (TRIGGER MODE2 : No.2)
		AUTO (AUTO MODE)		AUTO2 (AUTO MODE2 : No.3)
	Output Time Switch	10 ms	Output Mode Setting Switch	10 ms (10-ms output : No.3)
		50 ms		50 ms (50-ms output : No.4)
		CONTINUOUS		CONTINUOUS (CONTINUOUS output : No.5)
	Read Mode Switch Note. only V600-HAM91/-HAM81	DATA (DATA READ)	Read Mode Setting Switch	DATA READ1 (DATA READ : No.0)
		VERIFY (VERIFY READ)		VERIFY (VERIFY READ : No.2)
	Write Mode Switch Note. only V600-HAM91/-HAM81	BYTE (BYTE MODE)	Write Mode Setting Switch	1byte WRITE (1 byte Write mode : No.3)
		BIT SET (BIT SET MODE)		BIT SET (BIT SET mode : No.1)
		BIT CLR (BIT CLEAR MODE)		BIT CLEAR (BIT CLEAR mode: No.2)
V600-HAR92	Address Switch	---	Access Address Setting Switch	---
	Access Mode Switch	SYNC (SYNC MODE)	Access Mode Setting Switch	SYNC3 (TRIGGER MODE3 : No.4)
		AUTO (AUTO MODE)		AUTO3 (AUTO MODE3 : No.5)
	Output OFF-delay Time Switch	10 ms	Output Mode Setting Switch	10 ms OFFDELAY (10-ms OFF delay : No.0)
		50 ms		50 ms OFFDELAY (50-ms OFF delay : No.1)
		500 ms		500 ms OFFDELAY (500-ms OFF delay : No.2)
	Output Mode Switch	OUTPUT MODE1 (Standard Mode)	Read Mode Setting Switch	DATA READ1 (READ : No.0)
		OUTPUT MODE2 (Wiring Sabing Mode)		DATA READ2 (Wire-saving mode : No.1)

Mode Function Table

Some of the functions cannot be used in the V600-compatible mode.

Refer to followings table which shows supported functions for each mode.

Function \ Mode Setting		AUTO MODE1 TRIGGER MODE1	V600-Compatible Mode	
			AUTO MODE2 TRIGGER MODE2	AUTO MODE3 TRIGGER MODE3
READ	16bits read	●	(●)(See Note1.)	●
	Verify read	●	●	
	Read with wire-saving mode (See Note2.)	●		●
WRITE	1byte Write	●	●	
	2byte Write	●	●	
	BIT SET, BIT CLEAR	●	●	
PARITY CHECK		●		●
NOISE MEASUREMENT		●		
ADDRESS SHIFT		●		

Note1. Output the error code in the data output bits(OD0 to OD15) .

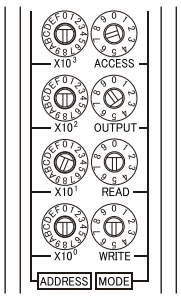
2. The data output bits(OD0 to OD15) turns FFFF hex(ON all bits), when error is occurred.

While V600-series can change the Address switches during power is being supplied, V680 series cannot be changed the Access Address Switches. The V680 series reads the Access Address Setting Switches only when power supply is turned ON. Turn OFF the power supply before changing the Access address setting switches.

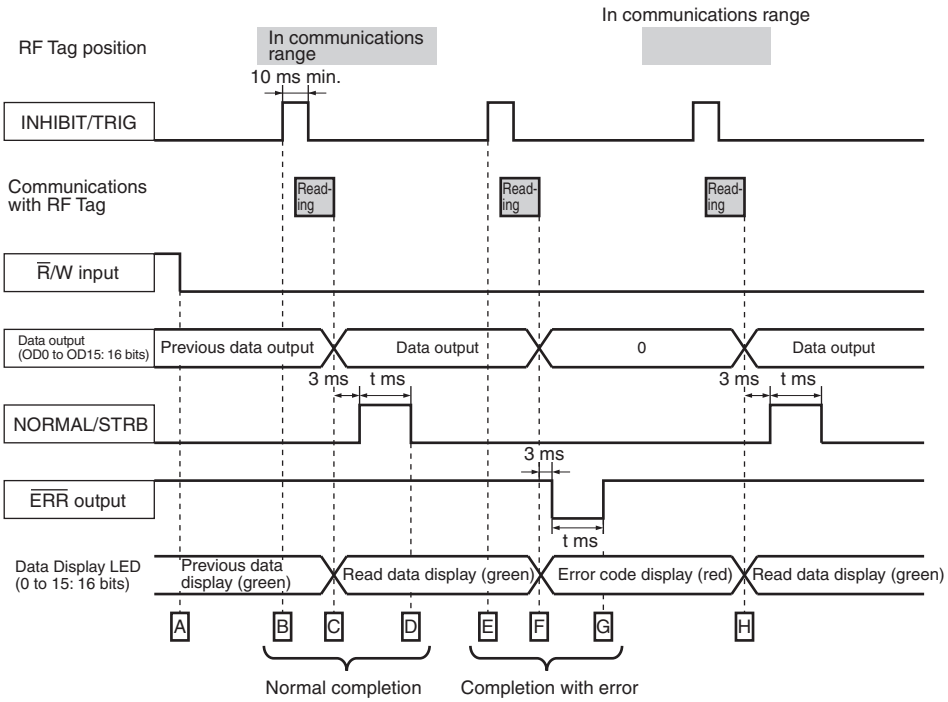
Timing Charts : Mode2

■ Trigger Mode 2: Read

Mode setting switch settings



Access Address : 0010 hex
Output Time : 50 ms



A. Preparations — Before starting communications with the RF Tag, turn OFF the R/W input.

▪ Normal Completion of Communications with RF Tag

B. Start of communications — Turn ON the INHIBIT/TRIG input to start communications with the RF Tag after confirming the RF Tag is in the communications area of the Antenna.

C. End of communications — If communications with the RF Tag are completed normally, the ID Flag Sensor will turn ON the NORM/STRB output, store the parity value in the PARITY output, and store the read data in the data output bits (OD0 to OD15). The Data Display LED(0 to 15) corresponding to the read data will be lit green.

D. Clearing results — The NORMAL/STRB output will be turned OFF after the time set for the fixed time in the output mode time setting has elapsed.

F. Clearing data — The data output bits(OD0 to OD15) and the Data Display LED(O to 15) wil be held until nxt data is output.

▪ Error Completion of Communications with RF Tag

E. Start of communications — Turn ON the INHIBIT/TRIG input to start communications with the RF Tag.

F. End of communications — If communications with RF Tag are completed with an error(No RF Tag error), the ID Flag Sensor will turn ON"0" the ERR output, and turns OFF all the bits in the data output bits(OD0 to OD15). The Data Display LED(0 to 15) corresponding to the error code will lit red.

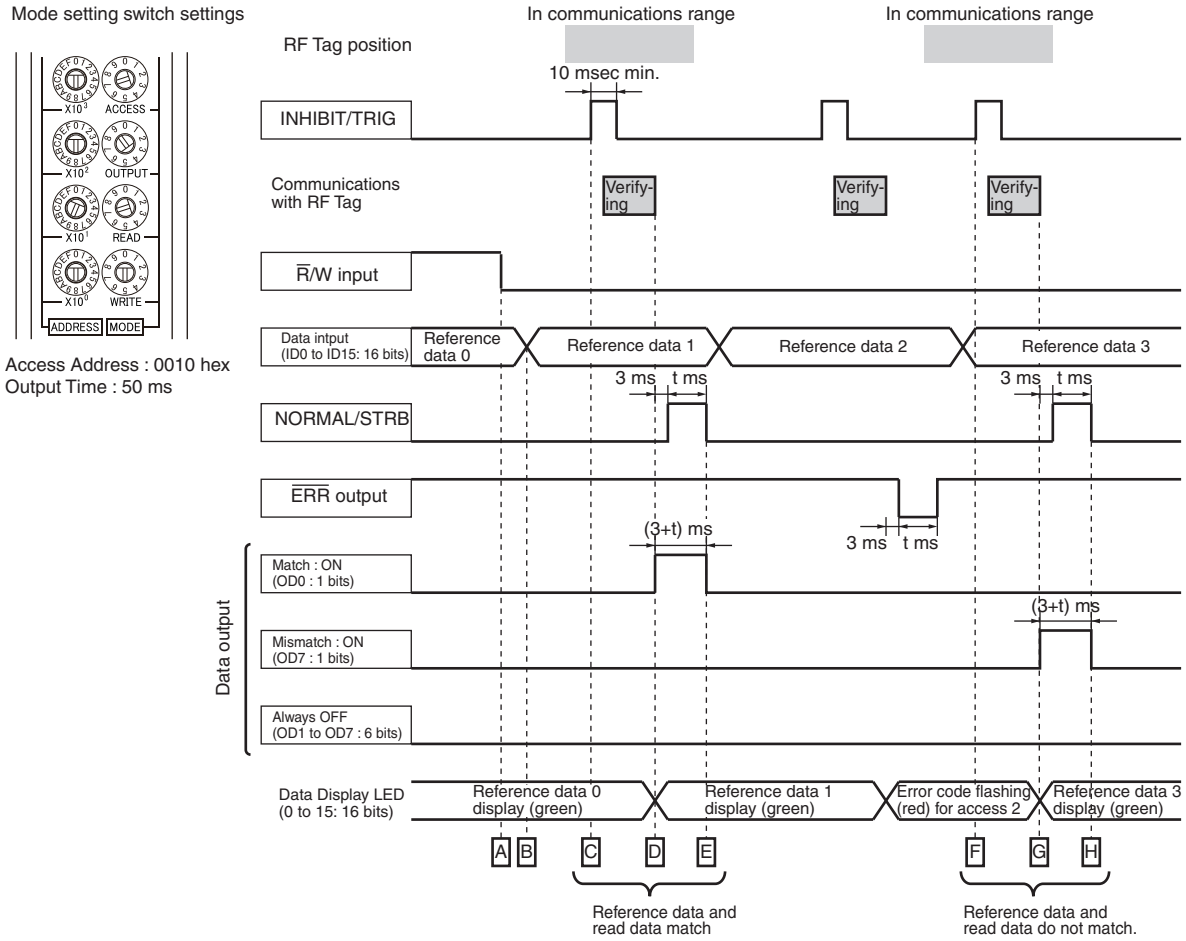
G. Clearing results — The ERR output will be turned OFF"1" after the time set for the fixed time in the output mode time setting has elapsed.

H. Clearing data — The data output bits(OD0 to OD15) and the Data Display LED(O to 15) wil be held until nxt data is output.

CHECK!

- At least 10 ms is required for INHIBIT/TRIG input.
- Wait at least 10 ms after switching the R/W input line before performing next process.
- Read the data output(OD0 to OD15) after the NORMAL/STRB output turns ON. The NORMAL/STRB output and ERR output will be held until the next time the trigger is turned ON if the output time setting switch is set to CONTINUOUS.

■ Trigger Mode 2: VERIFY



A, B. Preparations — Turn OFF the R/W input before starting communications with the RF Tag, set reference data on the data input bits(ID0 to ID15).

▪ Reference Data and Read Data Match

C. Start of communications — Turn ON the INHIBIT/TRIG input to start communications with the RF Tag after confirming the RF Tag is in the communications area of the Antenna.

D. End of communications — If communications with the RF Tag are completed normally, the ID Flag Sensor will turn ON the NORMAL/STRB output and the data output bit (OD0: data match). The VERIFY OK/NG indicator will be lit green, and the Data Display LED (0 to 15) corresponding to the reference data will be lit green.

E. Clearing results — The NORMAL/STRB output and data output bit(OD0) will be turned OFF after the time set for the fixed time in the output mode time setting has elapsed. The NORMAL/STRB output is unconditionally cleared by turning ON the next INHIBIT/TRIG input even if it is within the output time period.

▪ Reference Data and Read Data Mismatch

F. Start of communications — Turn ON the INHIBIT/TRIG input to start communications with the RF Tag after confirming the RF Tag is in the communications area of the Antenna.

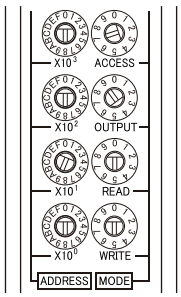
G. End of communications — If communications with the RF Tag are completed normally, the ID Flag Sensor will turn ON the NORMAL/STRB output and the data output bit (OD7: data mismatch). The VERIFY OK/NG indicator will be lit red, and the Data Display LED (0 to 15) corresponding to the reference data will be lit green.

H. Clearing results — The NORMAL/STRB output and data output bit(OD0) will be turned OFF after the time set for the fixed time in the output mode time setting has elapsed. The NORMAL/STRB output is unconditionally cleared by turning ON the next INHIBIT/TRIG input even if it is within the output time period.

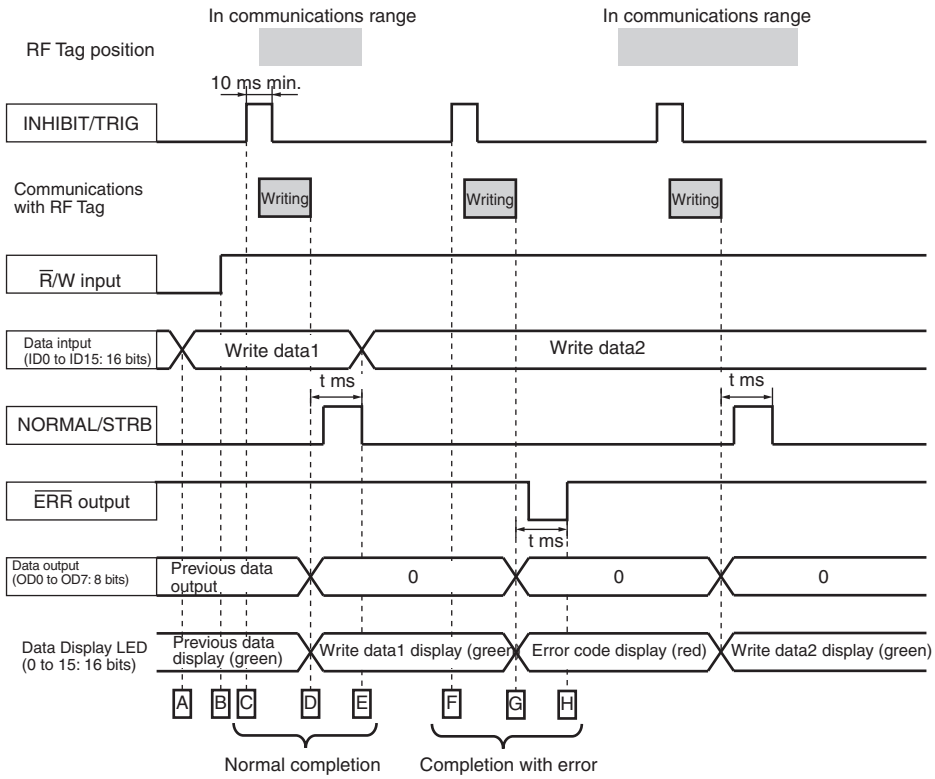
CHECK!
- At least 10 ms is required for INHIBIT/TRIG input.
- Wait at least 10 ms after switching the R/W input line before performing next process.
- Switch the reference data input (ID0 to ID15) at least 10 ms before accessing the RF Tag(e.g., at least 10 ms before turning ON the trigger input).
- Read the data output(OD0 to OD15) after the NORMAL/STRB output turns ON. The NORMAL/STRB output and ERR output will be held until the next time the trigger is turned ON if the output time setting switch is set to CONTINUOUS.

■ Trigger Mode 2: Write

Mode setting switch settings



Access Address : 0010 hex
Output Time : 50 ms



A, B. Preparations — Turn OFF the R/W input before starting communications with the RF Tag, set the write data on the data input bits (ID0 to ID15).

▪ Normal Completion of Communications with RF Tag

C. Start of communications — Turn ON the INHIBIT/TRIG input to start communications with the RF Tag after confirming the RF Tag is in the communications area of the Antenna.

D. End of communications — If communications with the RF Tag are completed normally, the ID Flag Sensor will turn ON the NORMAL/STRB output, and all the data output bits(OD0 to OD15) turns OFF. The Data Display LED (0 to 15) corresponding to the write data will be lit green.

E. Clearing results — The NORMAL/STRB output will be turned OFF after the time set for the fixed time in the output mode time setting has elapsed.

▪ Error Completion of Communications with RF Tag

F. Start of communications — Turn ON the INHIBIT/TRIG input to start communications with the RF Tag.

G. End of communications — IF communications with the RF Tag are completed with an error(No RF Tag error in this case), the ID Flag Sensor will turn ON"0" the ERR output, and all the data output bits (OD0 to OD15) turns OFF. The Data Display LED(0 to 15) corresponding to the error code will be lit red.

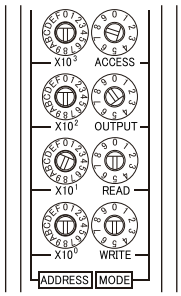
H. Clearing results — The ERR output will be turned OFF"1" after the time set for the fixed time in the output mode time setting has elapsed.

CHECK!

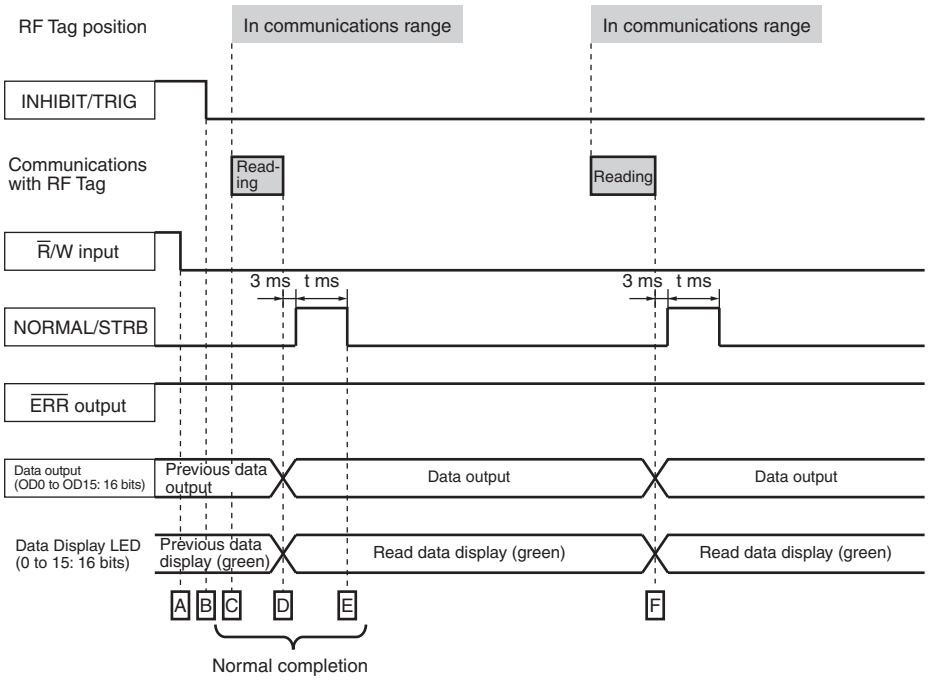
- At least 10 ms is required for INHIBIT/TRIG input.
- Wait at least 10 ms after switching the R/W input line before performing next process.
- Switch the write data input (ID0 to ID15) at least 10 ms before accessing the RF Tag(e.g., at least 10 ms before turning ON the trigger input).
- The NORMAL/STRB output and ERR output will be held until the next time the trigger is turned ON if the output time setting switch is set to CONTINUOUS.

■ Auto Mode 2: Read

Mode setting switch settings



Access Address : 0010 hex
Output Time : 50 ms



A. Preparations	Before starting communications with the RF Tag, turn OFF the R/W input.
B. Canceling communications prohibition	Turn OFF the INHIBIT/TRIG before starting communications.

▪ Normal Completion of Communications with RF Tag

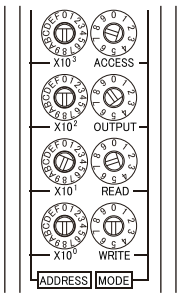
C. Start of communications	The ID Flag Sensor will start communications with the RF Tag when the RF Tag enters the communications area of the Antenna.
D. End of communications	If communications with the RF Tag are completed normally, the ID Flag Sensor will turn ON the NORMAL/STRB output and will store the read data in the data output bits (OD0 to OD15). The Data Display LED (0 to 15) corresponding to the read data will be lit green.
E. Clearing results	The NORMAL/STRB output will be turned OFF after the time set for the fixed time in the output mode time setting has elapsed.
F. Clearing data	The data output bits(OD0 to OD15) and the Data Display LED(O to 15) will be held until next data is output. The NORMAL/STRB output , the data output bits(OD0 to OD15) and the Data Display LED can be unconditionally cleared by turning ON the INHIBIT/TRIG input.

CHECK!

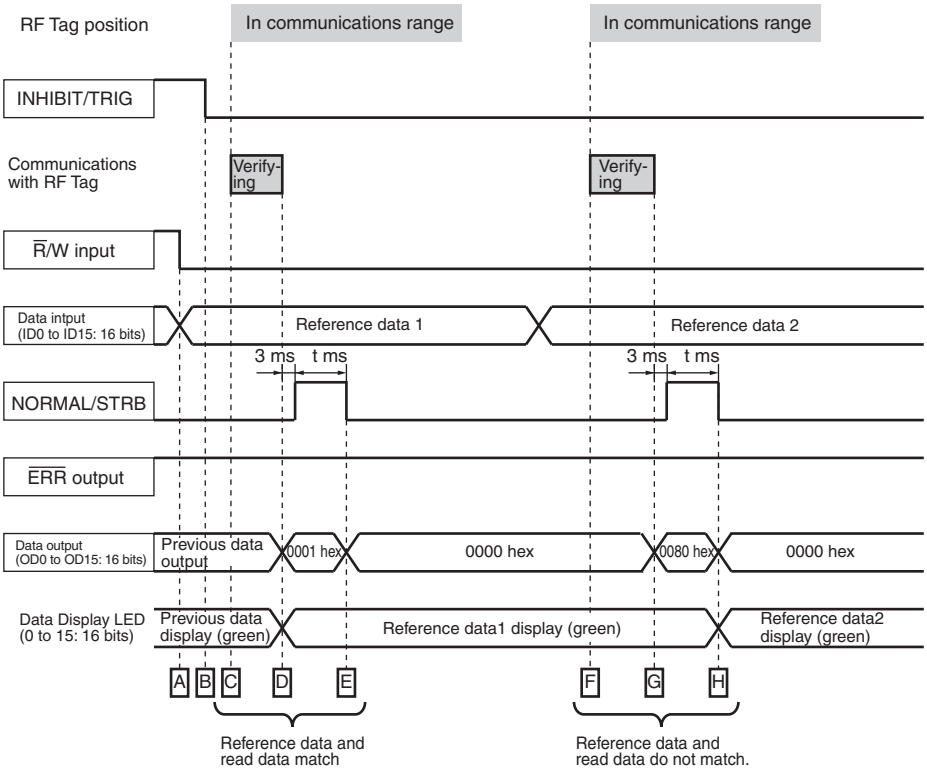
- At least 10 ms is required for enabling INHIBIT/TRIG input as operation prohibit or clear the data.
- Wait at least 10 ms after switching the R/W input line before performing next process.
- Read the data output (OD0 to OD15) after the NORMAL/STRB output turns ON.
- In Auto Mode, the ID Flag Sensor does not output the error in case when the ID Flag Sensor can not complete the communication process caused by passing the RF Tag quickly in the communications area of the Antenna before completing the communication or interfering by electrical noise. Be sure to check the communications carefully when installing the system.

■ Auto Mode 2: VERIFY

Mode setting switch settings



Access Address : 0010 hex
Output Time : 50 ms



A. Preparations — Before starting communications with the RF Tag, turn OFF the R/W input, set the reference data on the data input bits (ID0 to ID15).

B. Canceling communications prohibition — Turn OFF the INHIBIT/TRIG before starting communications.

▪ Reference Data and Read Data Match

C. Start of communications — The ID Flag Sensor will start communications with the RF Tag when the RF Tag enters the communications area of the Antenna.

D. End of communications — If communications with the RF Tag are completed normally, the ID Flag Sensor will turn ON the NORMAL/STRB output and the data output bit (OD0: data match). The VERIFY OK/NG indicator will be lit green, and the data indicators (0 to 15) corresponding to the reference data will be lit green.

E. Clearing results — The NORMAL/STRB output and the data output bit(OD0) will be turned OFF after the time set for the fixed time in the output mode time setting has elapsed. The NORMAL/STRB output , the data output bits (OD0 to OD15) and the Data Display LED can be unconditionally cleared by turning ON the INHIBIT/TRIG input.

▪ Reference Data and Read Data Mismatch

F. Start of communications — The ID Flag Sensor will start communications with the RF Tag when the RF Tag enters the communications area of the Antenna.

G. End of communications — If communications with the RF Tag are completed normally, the ID Flag Sensor will turn ON the NORMAL/STRB output and the data output bit (OD7: data mismatch). The VERIFY OK/NG indicator will be lit red, and the data indicators (0 to 15) corresponding to the reference data will be lit green.

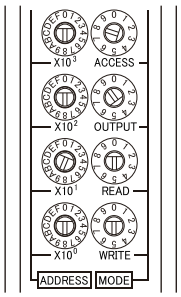
H. Clearing results — The NORMAL/STRB output and the data output bit(OD7) will be turned OFF after the time set for the fixed time in the output mode time setting has elapsed. The NORMAL/STRB output , the data output bits(OD0 to OD15) and the Data Display LED can be unconditionally cleared by turning ON the INHIBIT/TRIG input.

CHECK!

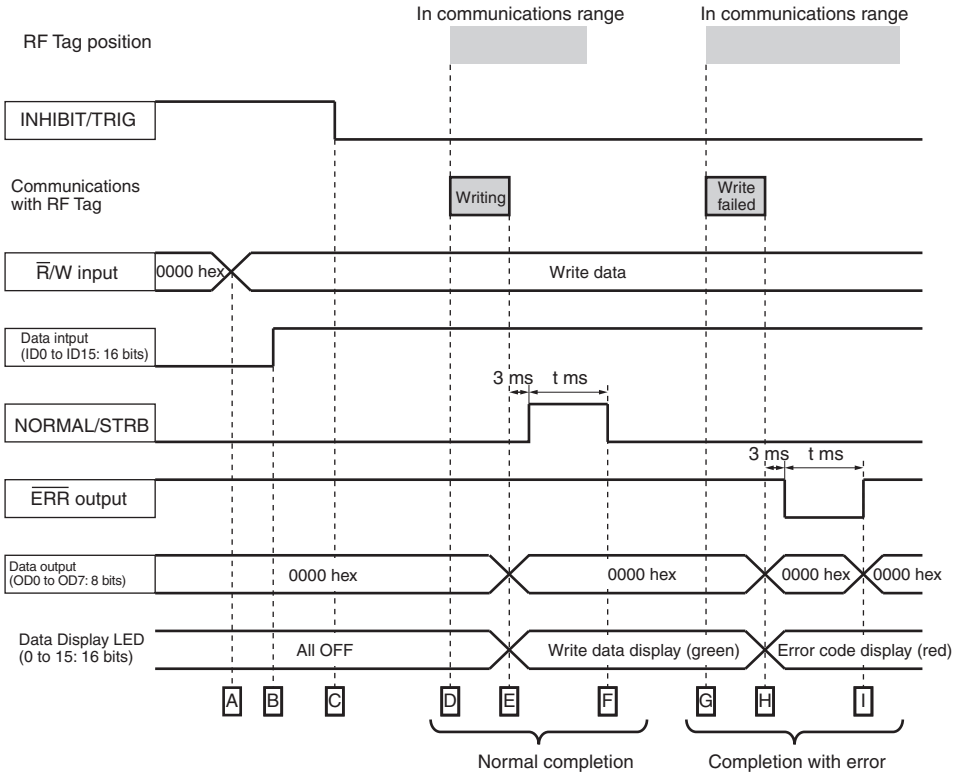
- At least 10 ms is required for enabling INHIBIT/TRIG input as operation prohibit or clear the data.
- Wait at least 10 ms after switching the R/W input line before performing next process.
- Switch the reference data input (ID0 to ID15) at least 10 ms before accessing the RF Tag(e.g., at least 10 ms before turning ON the trigger input).
- Read the data output(OD0 to OD15) after the NORMAL/STRB output turns ON.
- In Auto Mode, the ID Flag Sensor does not output the error in case when the ID Flag Sensor can not complete the communication process caused by passing the RF Tag quickly in the communications area of the Antenna before completing the communication or interfering by electrical noise. Be sure to check the communications carefully when installing the system.

■ Auto Mode 2: Write

Mode setting switch settings



Access Address : 0010 hex
Output Time : 50 ms



A, B. Preparations	Turn ON the R/W input before starting communications with the RF Tag, set the write data on the data input bits (ID0 to ID15).
C. Canceling communications prohibition	Turn OFF the INHIBIT/TRIG before starting communications.

▪ Normal Completion of Communications with RF Tag

D. Start of communications	The ID Flag Sensor will start communications with the RF Tag when the RF Tag enters the communications area of the Antenna.
E. End of communications	If communications with the RF Tag are completed normally, the ID Flag Sensor will turn ON the NORMAL/STRB output. The Data Display LED (0 to 15) corresponding to the write data will be lit green.
F. Clearing results	The NORMAL/STRB output will be turned OFF after the time set for the fixed time in the output mode time setting has elapsed. The NORMAL/STRB output , the data output bits(OD0 to OD15) and the Data Display LED can be unconditionally cleared by turning ON the INHIBIT/TRIG input.

▪ Error Completion of Communications with RF Tag

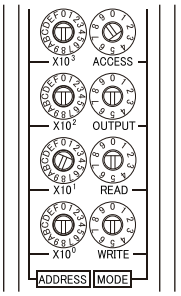
G. Start of communications	The ID Flag Sensor will start communications with the RF Tag when the RF Tag enters the communications area of the Antenna.
H. End of communications	If communications with the RF Tag are completed with an error(Write Verify error, Lock error, Write-protect error etc.), the ID Flag Sensor will turn ON"0" the ERR output and all the data output bits(OD0 to OD15) turns OFF.The Data Display LED(0 to 15) corresponding to the error code will be lit red.
I. Clearing results	The ERR output will be turned OFF"1" after the time set for the fixed time in the output mode time setting has elapsed. The ERR output , the data output bits(OD0 to OD15) and the Data Display LED can be unconditionally cleared by turning ON the INHIBIT/TRIG input.

CHECK!
- At least 10 ms is required for enabling INHIBIT/TRIG input as operation prohibit or clear the data.
- Wait at least 10 ms after switching the R/W input line before performing next process.
- Switch the write data input (ID0 to ID15) at least 10 ms before accessing the RF Tag.
- Read the data output(OD0 to OD15) after the NORMAL/STRB output turns ON.
- In Auto Mode, the ID Flag Sensor does not output the error in case when the ID Flag Sensor can not complete the communication process caused by passing the RF Tag quickly in the communications area of the Antenna before completing the communication or interfering by electrical noise. Be sure to check the communications carefully when installing the system.

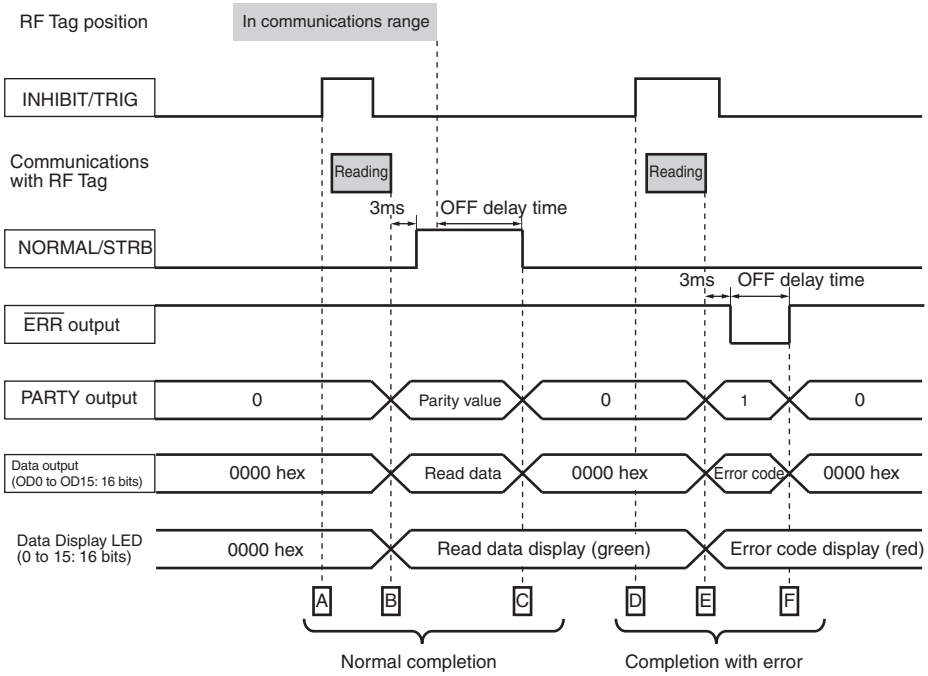
Timing Charts : Mode3

■ Trigger Mode 3: Read

Mode setting switch settings



Access Address : 0010 hex
Output Mode : 10 ms OFF delay



▪ Normal Completion of Communications with RF Tag

A. Start of communications	Turn ON the INHIBIT/TRIG input to start communications with the RF Tag.
B. End of communications	If communications with the RF Tag are completed normally, the ID Flag Sensor will turn ON the NORMAL/STRB output , store the parity value in the PARITY output, and store the read data in the data output bits(OD0 to OD15). The Data Display LED(0 to 15) corresponding to the read data will be lit green.
C. Clearing results	After the RF Tag is out of the communications area of the Antenna, the NORMAL/STRB output and PARITY output and data output bits(OD0 to OD15) will be turned OFF after the time set for the OFF delay in the output mode time setting has elapsed.

▪ Error Completion of Communications with RF Tag

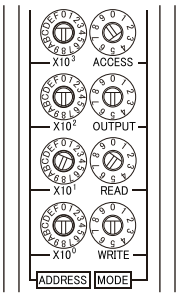
D. Start of communications	Turn ON the INHIBIT/TRIG input to start communications with the RF Tag.
E. End of communications	If communications with the RF Tag are completed with an error(No RF Tag error), the ID Flag Sensor will turn ON "0" the $\overline{\text{ERR}}$ output , store the parity value("1") in the PARITY output, and store the error code in the data output bits(OD0 to OD15). The Data Display LED(0 to 15) corresponding to the read data will be lit red.
F. Clearing results	The $\overline{\text{ERR}}$ output and PARITY output and data output bits(OD0 to OD15) will be turned OFF after the time set for the OFF delay in the output mode time setting has elapsed.

CHECK!

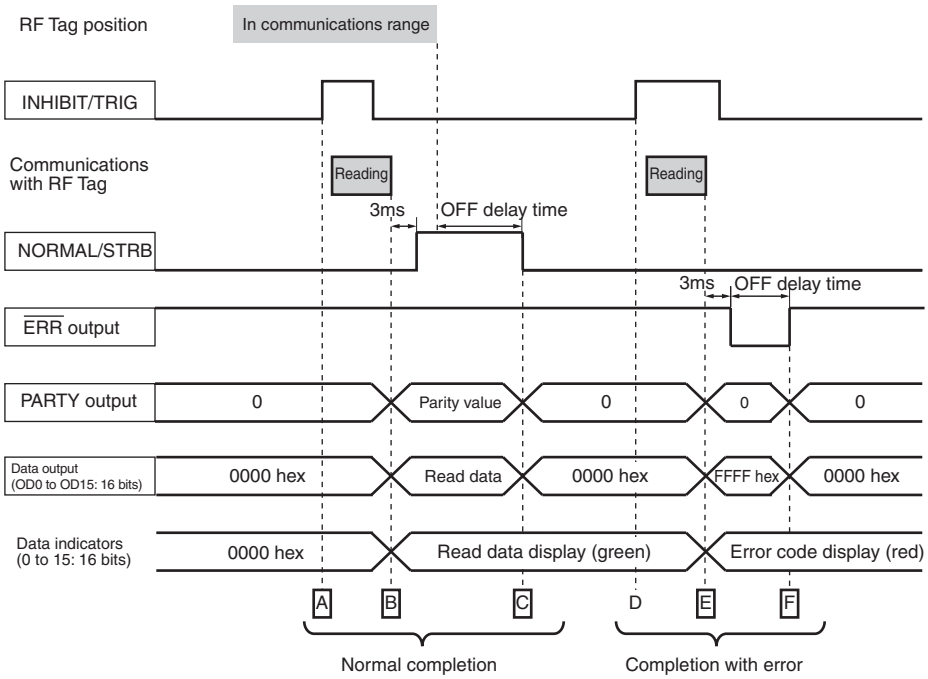
- At least 10 ms is required for INHIBIT/TRIG input.
- Read the data output(OD0 to OD15) after the NORMAL/STRB output turns ON.
- Write function can not be used in the Trigger Mode3. R/W input is ignored.

■ Trigger Mode 3: Read with Wire-saving mode

Mode setting switch settings



Access Address : 0010 hex
Output Mode : 10 ms OFF delay



▪ Normal Completion of Communications with RF Tag

A. Start of communications	Turn ON the INHIBIT/TRIG input to start communications with the RF Tag.
B. End of communications	If communications with the RF Tag are completed normally, the ID Flag Sensor will turn ON the NORMAL/STRB output , store the parity value in the PARITY output, and store the read data in the data output bits(OD0 to OD15). The Data Display LED(0 to 15) corresponding to the read data will be lit green.
C. Clearing results	After the RF Tag is out of the communications area of the Antenna, the NORMAL/STRB output and PARITY output and data output bits(OD0 to OD15) will be turned OFF after the time set for the OFF delay in the output mode time setting has elapsed.

▪ Error Completion of Communications with RF Tag

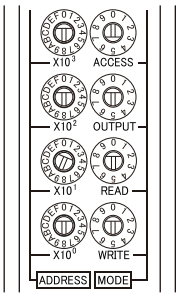
D. Start of communications	Turn ON the INHIBIT/TRIG input to start communications with the RF Tag.
E. End of communications	If communications with the RF Tag are completed with an error, the ID Flag Sensor will turn ON the $\overline{\text{ERR}}$ output , store the parity value("0") in the PARITY output, and store FFFF hex(ON all bits) in the data output bits(OD0 to OD15). The Data Display LED(0 to 15) corresponding to the read data will be lit red.
F. Clearing results	The $\overline{\text{ERR}}$ output and PARITY output and data output bits(OD0 to OD15) will be turned OFF after the time set for the OFF delay in the output mode time setting has elapsed.

CHECK!

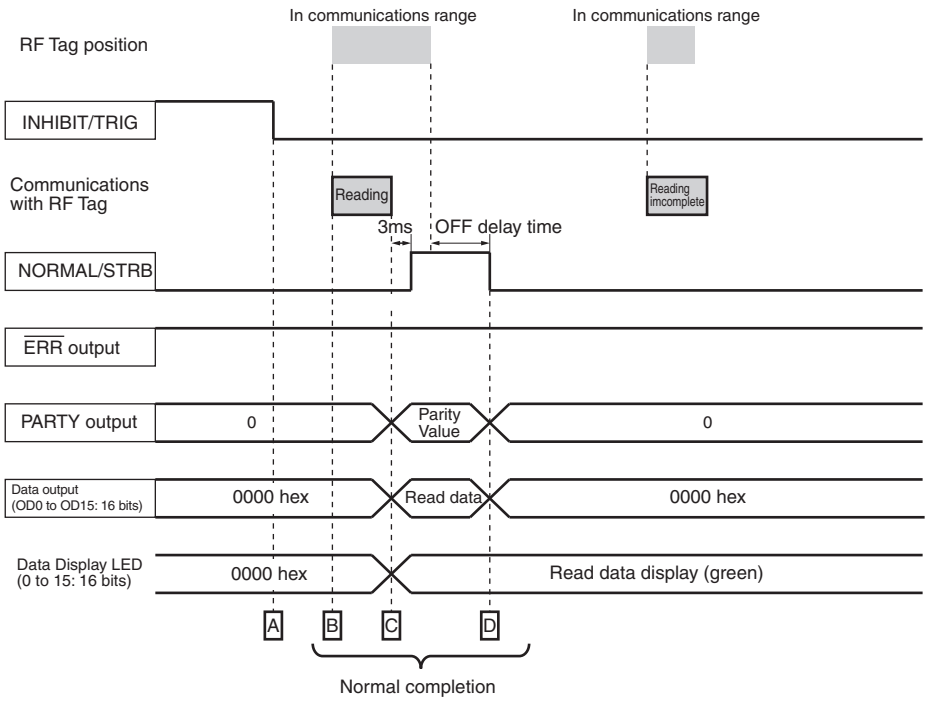
- At least 10 ms is required for INHIBIT/TRIG input.
- Write function can not be used in the Trigger Mode3. $\overline{\text{R}}$/W input is ignored.
- If communications control will be performed using only data output lines without using the NORMAL/STRB output, for example, implement programming for a timer with a specified time, check the status of each data output line at each specified time, and read the outputs as data after the data is all zeros or all ones.
- All ones and all zeros of data outputs cannot be used as data.
- All data output bits will be ON when an error occurs, not to output error code. The Data Display LED(0 to 15) will flash the error code in red corresponding to the occurring error.

■ Auto Mode 3: Read

Mode setting switch settings



Access Address : 0010 hex
Output Mode : 10 ms OFF delay



A. Canceling communications prohibition — Turn OFF the INHIBIT/TRIG input before starting communications.

▪ Normal Completion of Communications with RF Tag

B. Start of communications — The ID Flag Sensor will start communications with the RF Tag when the RF Tag enters the communications area of the Antena.

C. End of communications — If communications with the RF Tag are completed normally, the ID Flag Sensor will turn ON the NORMAL/STRB ouput, and will store the read data in the data output bits(OD0 to OD15). The Data Display LED(0 to 15) corresponding to the read data will be lit green.

D. Clearing results — After the RF Tag is out of the communications area of the Antenna, the NORMAL/STRB output and data output bits(OD0 to OD15) will be turned OFF after the time set for the OFF delay in the output mode time setting has elapsed. The NORMAL/STRB output , the data output bits(OD0 to OD15) and the Data Display LED can be unconditionally cleared by turning ON the INHIBIT/TRIG input.

CHECK!

- At least 10 ms is required for enabling INHIBIT/TRIG input as operation prohibit or clear the data.
- Read the data output(OD0 to OD15) after the NORMAL/STRB output turns ON.
- Write function can not be used in the Auto Mode3. R/W input is ignored.
- In Auto Mode, the ID Flag Sensor does not output the error in case when the ID Flag Sensor can not complete the communication process caused by passing the RF Tag quickly in the communications area of the Antenna before completing the communication or interfering by electrical noise. Be sure to check the communications carefully when installing the system.
- Error in Auto Mode will occur when the input to the ID Flag Sensor has errors such as the external input error or address setting error at the time to start the communications with the RF Tag. In this case, the ID Flag Sensor will turns ON"0" the ERR output and will store the error code in the data output bits(OD0 to OD15) in Normal Read Mode, or will store FFFF hex(ON all bits) in Read Mode with Wire-saving mode. The Data Display LED(0 to 15) corresponding to the error code will be lit red.

Write Protect function for V600-compatible Mode

The write protection for V600-compatible modes (Trigger Mode2 : SYNC2, Auto Mode 2 : AUTO2) operates with the same method as the V600 (the previous model).
The V600 write protection function has two setting methods depending on the type of RF Tag. Use the following procedure to make the settings for each write protection method.

▪ V680-D1KP□□

Setting Write Protection

When the write end address is written to the address 0000 hex of the RF Tag, the area from the address 0001 hex to the end address will be write-protected.
The most significant bit of the address 0000 hex is used to enable and disable write protection. therefore, addresses 0080 hex to 03E7 hex can not be specified as the end address.
When the end address is specified as "00", 0001 hex to 03E7 hex will be write-protected.

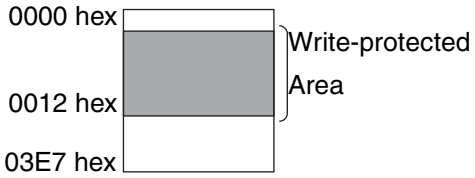
Address / Bit	7	6	5	4	3	2	1	0
0000 hex	Enable/ Disable	End address						

- The most significant bit of address 0000 hex is the Write-protect Bit.
  1: Enable write protection.
  0: Disable write protection.

- End Address Setting Range
  End address: 00 hex, 01hex to 7Fhex

Write Protection Setting Example
Write Protecting Addresses 0001 hex to 0012 hex

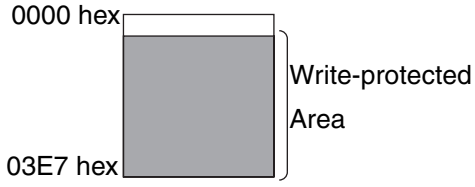
Address / Bit	7	6	5	4	3	2	1	0
0000 hex	1	0	0	1	0	0	1	0
	9				2			



Setting 00 hex as the End Address:

All addresses except address 0000 hex will be write-protected.

Address / Bit	7	6	5	4	3	2	1	0
0000 hex	1	0	0	0	0	0	0	0
	8				0			



Disabling Write Protection

To cleare write protection when it has been set, turn OFF the most significant bit of address 0000 hex. Write protection will be cleared and the start and end addresses set in addresses 0000 hex will be disabled.

CHECK!

Write Protection Precautions

- Address 0000 hex is never write-protected.
- The write protection start address is always 0001 hex. Therefore, write the data to be write-protected to an address higher than 0001 hex.

▪ V680-D2KF□□ / -D8KF□□ / -D32KF68

Setting Write Protection

Write protection is set in the 4 bytes of RF Tag addresses 0002 to 0005 hex.

The setting for the most significant bit of address 0002 hex enables or disables write protection for the RF Tag.

- The most signficant bit of address 0002 hex is the Write-protect Bit.
  1: Enable write protection.
  0: Disable write protection.

Setting Area Memory Map for RF Tag Write Protection

Address / Bit	7	6	5	4	3	2	1	0
0002 hex	Enable/Disable	Upper two digits of start address (00 to 7F)						
0003 hex	Lower two digits of start address (00 to FF)							
0004 hex	Upper two digits of end address (00 to FF)							
0005 hex	Upper two digits of end address (00 to FF)							

- Write Protection Setting Ranges
  Start address: 0006 hex to 7FFF hex
  End address: 0006 hex to FFFF hex

Address 0000 hex and 0001 hex are always write-protected.

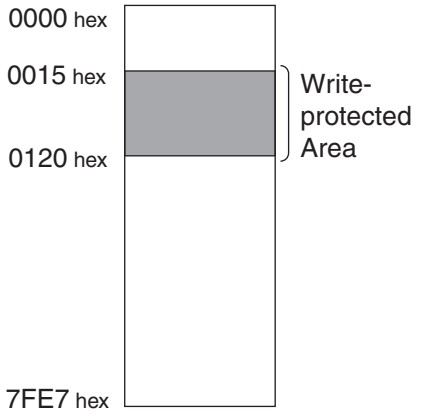
The write protection setting area of the RF Tag cannot be write-protected.

▪ Write Protection Setting Example

Start Address Lower Than the End Address

The memory area between the start address and end address will be write-protected.

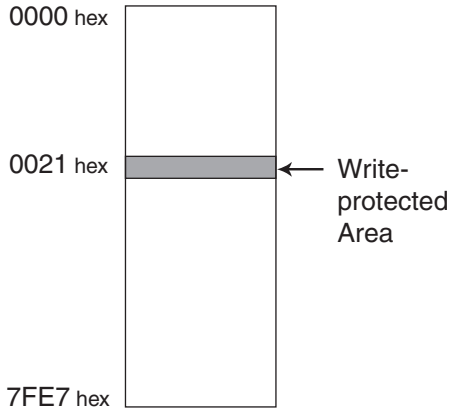
Address	Bit	Upper digits				Lower digits			
0002 hex		1	0	0	0	0	0	0	0
		8				0			
0003 hex		0	0	0	1	0	1	0	1
		1				5			
0004 hex		0	0	0	0	0	0	0	1
		0				1			
0005 hex		0	0	1	0	0	0	0	0
		2				0			



Start Address Equal to End Address

Only the selected address (one byte) will be write-protected.

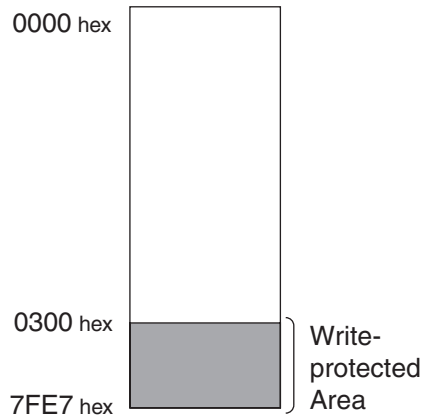
Address	Bit	Upper digits				Lower digits			
0002 hex		1	0	0	0	0	0	0	0
		8				0			
0003 hex		0	0	1	0	0	0	0	1
		2				1			
0004 hex		0	0	0	0	0	0	0	0
		0				0			
0005 hex		0	0	1	0	0	0	0	1
		2				1			



End Address Higher than the Last RF Tag Address

The memory area between the start address and the last RF Tag address will be write-protected.

Address	Bit	Upper digits				Lower digits			
0002 hex		1	0	0	0	0	0	1	1
		8				3			
0003 hex		0	0	0	0	0	0	0	0
		0				0			
0004 hex		0	0	0	0	0	0	1	1
		0				3			
0005 hex		1	1	1	1	1	1	1	1
		F				F			



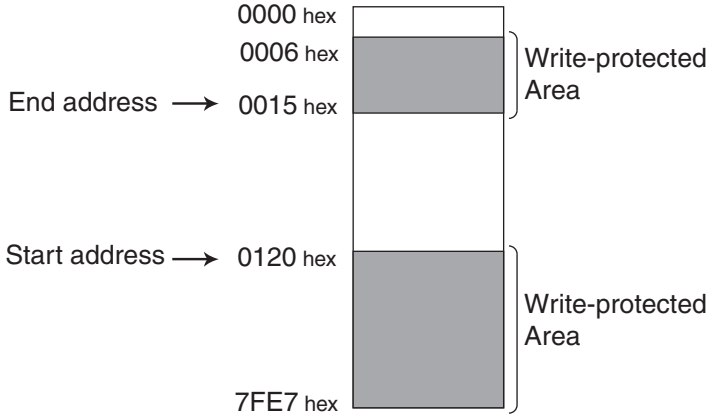
CHECK!

- The write protection setting area of the RF Tag cannot be write-protected.
- Address 0000 hex and 0001 hex are always write-protected.

Start Address Higher Than End Address

The memory area between the start address and the last RF Tag address, as well as the area between 0006 hex and the end address will be write-protected.

Address	Bit	Upper digits				Lower digits			
0002 hex		1	0	0	0	0	0	0	1
		8				1			
0003 hex		0	0	1	0	0	0	0	0
		2				0			
0004 hex		0	0	0	0	0	0	0	0
		0				0			
0005 hex		0	0	0	1	0	1	0	1
		1				5			



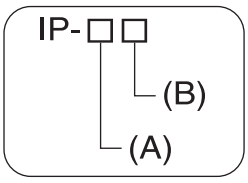
CHECK!

- The write protection setting area of the RF Tag cannot be write-protected.
- Address 0000 hex and 0001 hex are always write-protected.

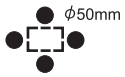
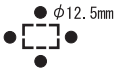
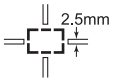
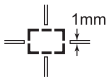
Degree of Protection

Ingress protection degrees (IP-□□) are determined by the following tests. Be sure to check the sealing capability under the actual operating environment and conditions before actual use.

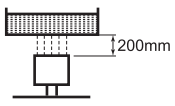
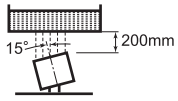
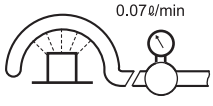
■ IEC (International Electrotechnical Commission) IEC 60529:1989-11

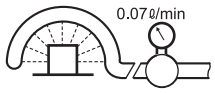
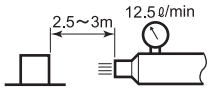
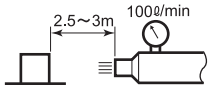
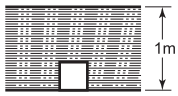


(A) First Digit: Degree of Protection from Solid Materials

Degree	Protection	
0		No protection
1		Protects against penetration of any solid object such as a hand that is 50 mm or more in diameter.
2		Protects against penetration of any solid object, that is 12.5 mm or more in diameter. Even if finger or other object 12 mm in diameter penetrates, it will not reach a hazardous part.
3		Protects against penetration of any solid object, such as a wire, that is 2.5 mm or more in diameter.
4		Protects against penetration of any solid object, such as a wire, that is 1 mm or more in diameter.
5		Protects against penetration of dust of a quantity that may cause malfunction or obstruct the safe operation of the product.
6		Protects against penetration of all dust.

(B) Second Digit: Degree of Protection Against Water

Degree	Protection		Test method (with pure water)
0	No protection	Not protected against water.	No test
1	Protection against water drops	Protects against vertical drops of water towards the product.	Water is dropped vertically towards the product from the test machine for 10 min. 
2	Protection against water drop	Protects against drops of water approaching at a maximum angle of 15° to the left, right, back, and front from vertical towards the product.	Water is dropped for 2.5 min each (i.e., 10 min in total) towards the product inclined 15° to the left, right, back, and front from the test machine. 
3	Protection against sprinkled water	Protects against sprinkled water approaching at a maximum angle of 60° from vertical towards the product.	Water is sprinkled for 10 min at a maximum angle of 60° to the left and right from vertical from the test machine. 

Degree	Protection		Test method (with pure water)
4	Protection against water spray	Protects against water spray approaching at any angle towards the product.	Water is sprayed at any angle towards the product for 10 min from the test machine. 
5	Protection against water jet spray	Protects against water jet spray approaching at any angle towards the product.	Water is jet sprayed at any angle towards the product for 1 min per square meter for at least 3 min in total from the test machine. 
6	Protection against high pressure water jet spray	Protects against high-pressure water jet spray approaching at any angle towards the product.	Water is jet sprayed at any angle towards the product for 1 min per square meter for at least 3 min in total from the test machine. 
7	Protection against limited immersion in water	Resists the penetration of water when the product is placed underwater at specified pressure for a specified time.	The product is placed 1 m deep in water (if the product is 850 mm max. in height) for 30 min. 
8 (See note.)	Protection against long-term immersion in water	Can be used continuously underwater.	The test method is determined by the manufacturer and user.

Note: OMRON Test Method
Usage condition: 10 m or less under water in natural conditions
1. No water ingress after 1 hour under water at 2 atmospheres of pressure.
2. Sensing distance and insulation resistance specifications must be met after 100 repetitions of half hour in 5°C water and half hour in 85°C water.

■ Oil Resistance (OMRON in-house standard)

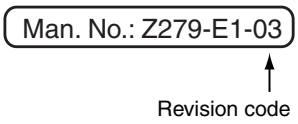
Protection	
Oil-resistant	No adverse affect from oil drops or oil spray approaching from any direction.
Oil-proof	Protects against penetration of oil drops or oil spray approaching from any direction.

Note: This OMRON in-house standard confirms resistance to cutting and other oils. It is equivalent to the former JEM standard.

MEMO

Revision History

A manual revision code appears as a suffix to the catalog number at the bottom of the front and rear pages.



Revision code	Date	Revised contents
01	March 2008	Original production
02	January 2009	Added items for V680-D1KP53M, V680-D8KF67/-D8KF67M RF Tags, overseas regulations and standards, and made other minor corrections.
02A	May 2009	The material of V680-D2KF67/-D2KF67M is changed.
03	January 2012	Added items for V680-D1KP52M-BT01/-D1KP52M-BT11/-D2KF52M-BT01/-D2KF52M-BT11 RF Tags. Deleted the related information on the overseas regulations and standards. Made other minor corrections.

OMRON Corporation
Industrial Automation Company
Sensing Devices Division H.Q.
Industrial Sensors Division
Shiokoji Horikawa, Shimogyo-ku,
Kyoto, 600-8530 Japan
Tel: (81)75-344-7022/Fax: (81)75-344-7107

Regional Headquarters
OMRON EUROPE B.V.
Sensor Business Unit
Carl-Benz-Str. 4, D-71154 Nufringen,
Germany
Tel: (49) 7032-811-0/Fax: (49) 7032-811-199

OMRON ELECTRONICS LLC
One Commerce Drive Schaumburg,
IL 60173-5302 U.S.A.
Tel: (1) 847-843-7900/Fax: (1) 847-843-7787

OMRON ASIA PACIFIC PTE. LTD.
No. 438A Alexandra Road # 05-05/08 (Lobby 2),
Alexandra Technopark, Singapore 119967
Tel: (65) 6835-3011/Fax: (65) 6835-2711

OMRON (CHINA) CO., LTD.
Room 2211, Bank of China Tower,
200 Yin Cheng Zhong Road,
PuDong New Area, Shanghai, 200120, China
Tel: (86) 21-5037-2222/Fax: (86) 21-5037-2200

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